Dental Digest

December 1955

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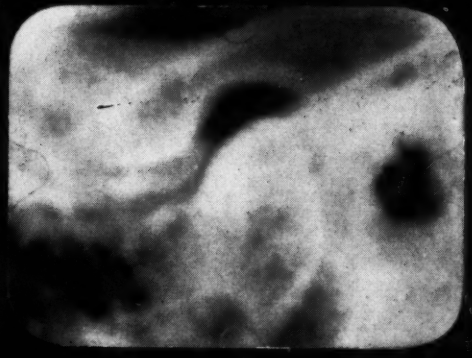


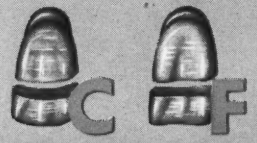
THE EASIEST, MOST ACCURATE PROCEDURE FOR TOOTH SELECTION

	36 MM	39 MM	40 MM	42 MM	43 MM	45 MM	46 MM	48 MM	51 MM
LONG	L36/C	L39/C L39/F		L42/C L42/F		L45/C L45/F		L48/C L48/F	L51/C
MEDIUM	M36/C	M39/C M39/F	M40/C M40/F	M42/C M42/F	M43/C M43/F	M45/C M45/F	M46/C M46/F	M48/C M48/F	M51/C
SHORT		S39/C S39/F	S40/C S40/F	S42/C S42/F	S43/C S43/F	S45/C S45/F	S46/C S46/F	S48/C S48/F	
WIDTH OF 6s SET-UP	40.0 MM	44.0 MM	44.5 MM	47.0 MM	48.0 MM	50.0 MM	51.0 MM	54.0 MM	59.0 MM

The entire line of Five-Phase Anterior molds are arranged logically and identified *understandably* in the Co-ordinate Size Mold System as shown on this diagram. The actual width, length and labial character required for each case specifies the correct Five-Phase Anterior mold.

2 The length of the upper anteriors is the measure of distance between the edge of the wax bite rim and high lip line.

3 Dominant labial character (Curved or Flat) may be obtained from pre-edentulous records or if none exists, the dominant labial characteristics of near blood-relatives will serve as a guide.



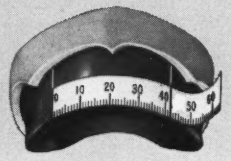
Because of the co-ordinate size system and the co-acting proximals of Five-Phase Anteriors, you can quickly select any combination of flat or curved centrals, laterals and cuspids to create personalized dentures for your patients.

The proximals of Five-Phase Anteriors are co-acting. When required, you can therefore transpose teeth from different sets to personalize esthetics. The logical, orderly arrangement of the Co-ordinate Size Mold System simplifies the transposition procedure.

1 *On the wax bite rim, inscribe the position of the central axis of each cuspid.*

One of the popular procedures followed for these guide lines is to place a straight edge at the alae of the nose and parallel to the central axis of the nose. This line continued to bite block will in 75% to 80% of general cases correspond to the central axes of cuspids.

A. The millimeter measurement taken between inscribed lines will correspond invariably to the numeral identification of the proper carded set of Five-Phase Anteriors.



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About Our CONTRIBUTORS

MILTON GOLDSTEIN, D.D.S. (The Thomas W. Evans Institute, University of Pennsylvania, 1934) is a general practitioner and a former contributor to the CLINICAL AND LABORATORY SUGGESTION department. His first article to appear in DIGEST describes a positioner which he has devised and its specific applications: INSTRUMENT AND METHOD FOR RADIOGRAPHY OF THE TEMPOROMANDIBULAR JOINT.

LOUIS WILLINGER, D.D.S. (New York University, College of Dentistry, 1922) formerly Chief of Oral Surgery, Lebanon Hospital Dental Clinic and Instructor in General Anesthesia for the First District Dental Society, and his collaborator, IRWIN G. TOMACK, D.D.S., Diplomate of the New York Board of Oral Surgery, Assistant Visiting Oral Surgeon at Bellevue Hospital, present an illustrated article, ORAL SURGERY PROCEDURES IN THE HOSPITAL.

EDWIN S. SMYD, B.S.D., D.D.S. (Northwestern University, Dental School, 1935) well known as an authority in dental engineering and biomechanics as related to restorative dentistry presents the second of his two-part illustrated article, DENTISTRY IS BIOPHYSICS.

JOSEPH EDWARD PRIMACK, D.M.D. (Tufts College Dental School, 1942) is a general practitioner and has been an instructor at Tufts College Dental School since his graduation. For his first appearance in DIGEST Doctor Primack presents a well documented, illustrated article, CEMENTOMA: DIFFERENTIAL DIAGNOSIS AND DISCUSSION.

EDWARD J. RYAN, B.S., D.D.S., Editor
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Instrument and Method for RADIOGRAPHY *of the* TEMPOROMANDIBULAR JOINT

MILTON GOLDSTEIN, D.D.S., Newark, New Jersey

DIGEST

Many instruments have been introduced to facilitate radiographing the temporomandibular joint. They are usually described as "simple" instruments but they are actually complicated.[2,4,5] A rapid, certain, uncomplicated method to record accurately the temporomandibular joint relationships is not available to the practitioner.

In daily practice the temporomandibular joint is involved in a variety of ways yet the joint relationships are not usually inspected before, during, or after dental treatment. As an added factor in many prosthetic reconstructions and in some orthodontic procedures a clear picture of the relationships of the condyles to the glenoid fossae and eminentia articularis would be of value.

In this article an instrument is described the simplicity of which makes it adaptable to routine procedures in the dental office. Step-by-step directions for the use of the instrument are given and each step is illustrated.

General Factors in Method of Use

The method used is characterized by the following advantages:

(a) The patient sits erect and comfortably (Fig. 7). The headrest is brought up to stabilize the head position. It is never necessary for the patient to assume an awkward and distorted position,[5] or to induce stresses and strains in the muscles above or below the mandible, or in the muscles of the neck. Distorted mandibular position is thereby prevented.

(b) The entrance point of the central ray is automatically determined (Fig. 3).

(c) The central ray is brought "on target" with precision (Fig. 5).

(d) The precise aim of the x-ray beam allows the use of a minimal aperture and thereby secondary or scatter radiation is greatly reduced (Fig. 4).

(e) There is automatic compensation in vertical angulation for variations in intercondylar widths.

(f) Four views are accomplished on one 5 by 7-inch plate, two right and two left (Fig. 8).

(g) The apparatus is adaptable to any standard dental x-ray machine. The aiming device is held by an adapter made for each make of x-ray machine (Fig. 4).

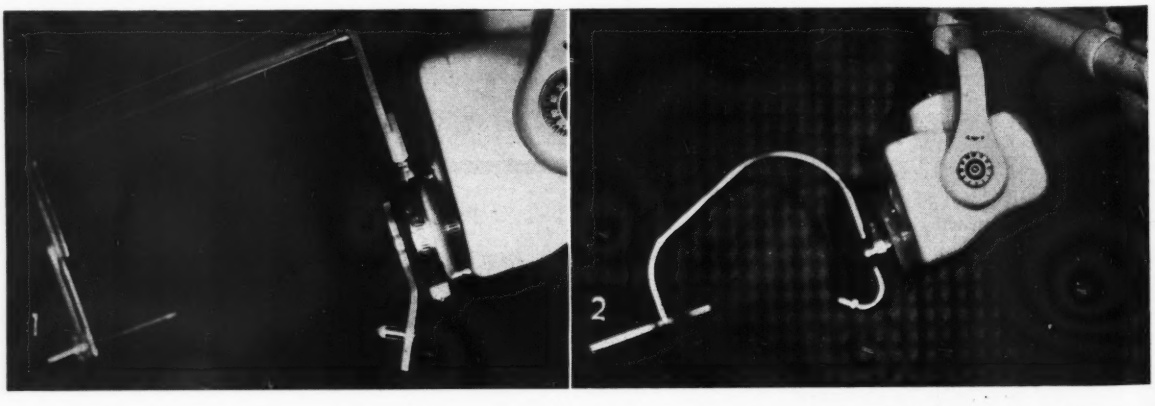
(h) For each patient the cassette position is fixed and can be repeated.

(i) Results are readily duplicated and radiographs made under similar conditions are accurately superimposable (Fig. 10).

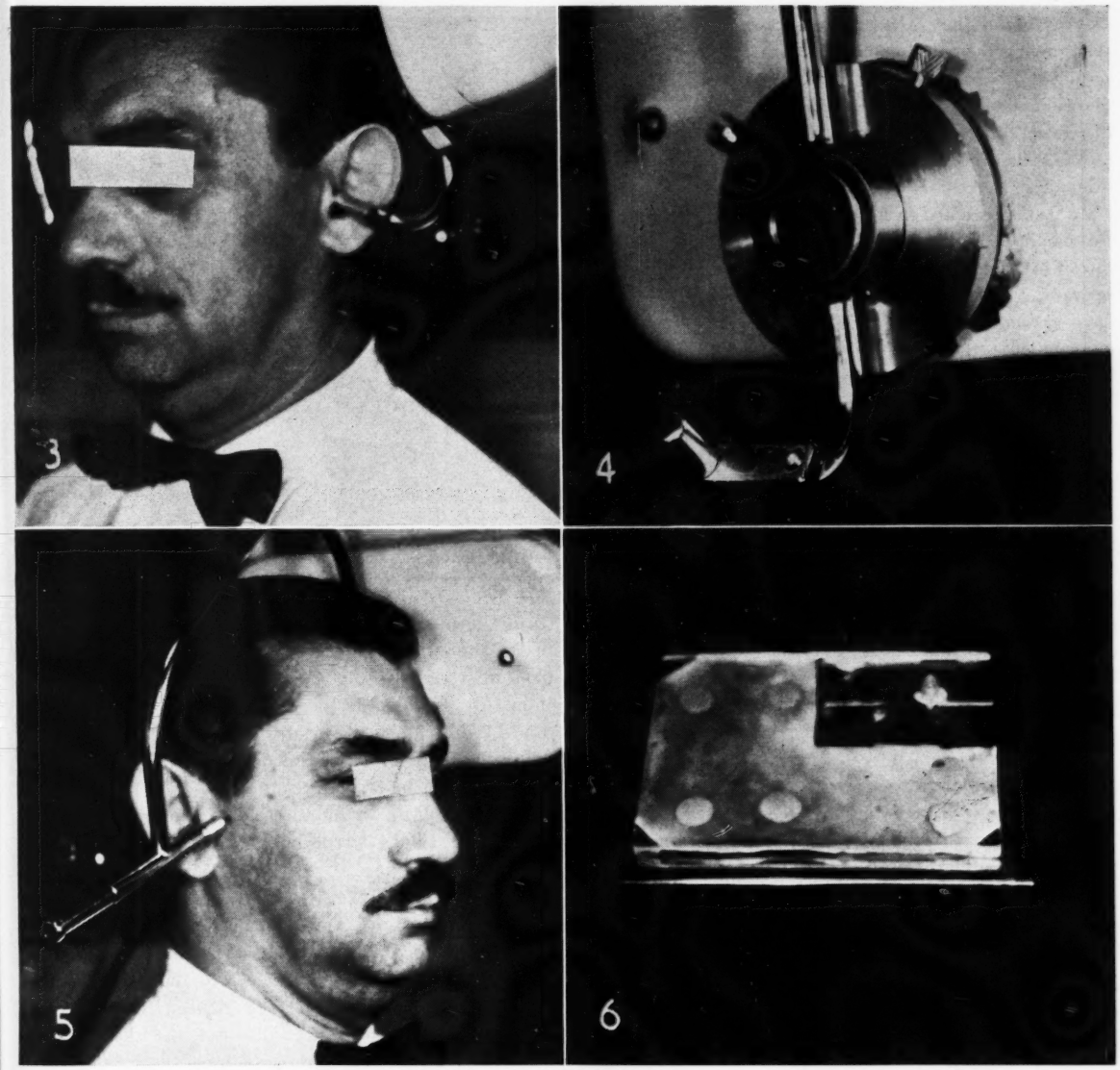
Entrance Point

The principal interfering structure

[1] McCall, John Oppie: Personal communication.
[2] Perkins, George T.: The Craniophorometer, JADA **50**:4 (April) 1955.
[3] Richards, Albert G., and Alling, Charles C.: Extraoral Radiography, Dental Radiography and Photography **28**:1, 1955.
[4] Schier, M.B.A.: Letters patent. Dec. 2, 1941, U.S. Patent Office Office #2,264,410.
[5] Updegrave, Wm. J.: Temporomandibular Articulation; X-ray Examination, **26**:3, 1953.



1. *Prototype of present instrument as constructed by the author, using Plexiglas® and self-curing acrylic.*
2. *The present stage of development of the instrument. (This model was constructed for the author by Olav Omholt of the Grenz-Ray Corp., 586 Avenue A, Bayonne, New Jersey.)*



3. *The entrance point measuring device.*

4. *Entrance point ear plug. Note the positions for right and left radiography, each measuring ½ inch from the vertical plane through the meatus.*

Lead diaphragm and aluminum filter. The assembly slides within the supporting tube to allow adjustment of the field diameter at the temporomandibular joint being radiographed.

5. *Aiming pointer. A pencil mark placed over the condyle is an aid in perfecting tube position and aim.*

6. *Cassette mask combination. The lead confines the effective field to ¼ of the film when larger diameter beam is used. The ear plug places the cassette in position in relation to the area being radiographed.*

in temporomandibular joint radiography is the petrous portion of the temporal bone of the side being radiographed. Since it rises above the level of the joint, the entrance point on the opposite side must be raised considerably.[1] Two and one-half inches above the external auditory meatus are sufficient. To bring the central ray into better alinement with the mediolateral axis of the head of the condyle, the entrance point is brought one-half inch posteriorly.[1]

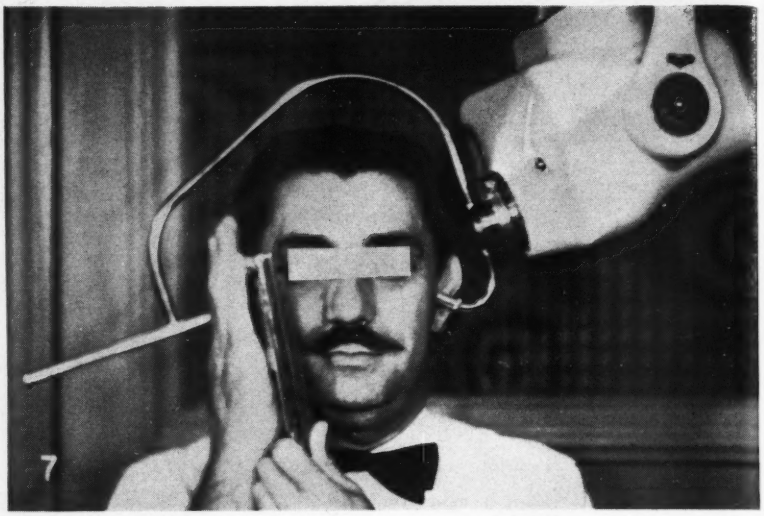
Contributing Factors in Distortion—This determination of the entrance point, or any other, will result in a distorted view of the temporomandibular joint. It is only by the standardization of this and other distortion factors that changes in condyle position become readable. The cassette position is another factor contributing to distortion.

Two Positions for Plug—The entrance point is automatically determined when the ear plug fits into or points at the external auditory meatus; there are two positions for the plug: (A) for right, and (B) for left.

Preferences for Position of En-

trance Point—Some investigators prefer to bring the entrance point 1 inch posterior to the external auditory meatus.[3] Others prefer the ½-inch distance; others emphasize in their methods the aim on the temporomandibular joint.[4,5]

Latitude Provided in New Model—Provision is being made in a new model for considerable latitude in the operator's choice of entrance point measurements. The author's experience indicates the occasional need for some variation. It will still be possible to standardize the entrance point determination for each patient.



7. *The instrument in use.*

Aim on Target

The back-action sliding pointer indicates the location of the central ray as it emerges on the side being radiographed. A pencil mark over the palpated condyle guides the operator in positioning the tube (Fig. 5). The aim is readily changed to follow the condyle in any position, for example, open, bite plane, rest, protrusive.

Beam Diameter

A wide x-ray beam is undesirable and unnecessary if the aim on the part being radiographed is precise. The smaller the beam, the less the secondary radiation, and the greater the detail recorded in the radiograph. An aperture of 11/16 inch (with the lead mask level with its supporting tube) gives a 2½-inch field at the temporomandibular joint. By sliding the mask outward from the tube, the field can be reduced (Fig. 4); by sliding it inward, the field can be increased. It is possible thereby to control not only the field covered but the degree of definition.

Vertical Angulation

With the fixed measured entrance point, vertical angulation will approximate 30°±5°. The determination of the angulation is automatic so long as the entrance point ear plug is in the meatus and the back action pointer is aimed at the condyle. Automatic compensation is thus provided in angulation for variations of the intercondylar widths.

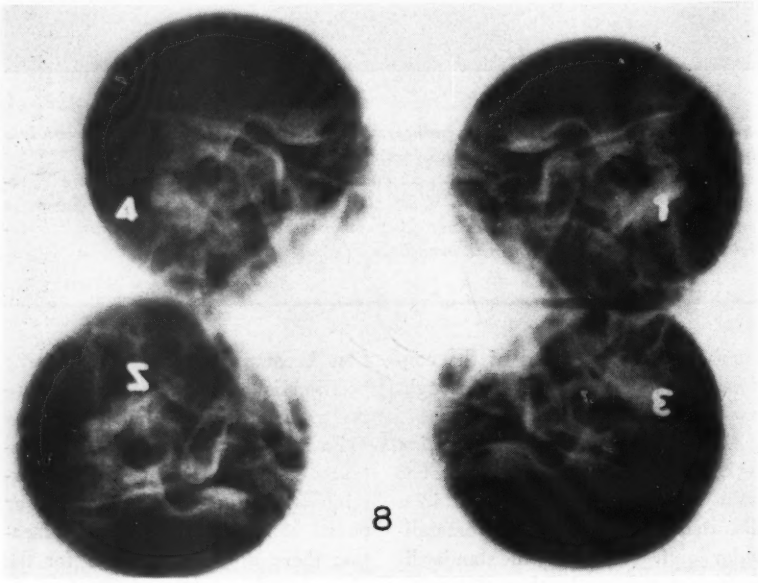
Reduction of Distortion

There is no "cone" on the instrument; the x-ray tube is brought up relatively close to the patient's head (Fig. 7). Shortening the target-film distance increases the distortion of the near structures relative to the far ones being radiographed.[5,2] A kind of "thinning out" of the near structures takes place, leaving the joint being radiographed in clearer view.

A 1-millimeter filter provides protection against the "burning" x-ray wave lengths.[5]

Cassette and Mask Combination

A 5 by 7-inch cassette has proved adequate for producing four temporomandibular joint views, two each, right and left. The occlusal size cassette was tried and was found adequate in size but results were poor because of insufficient spring pressure on the intensifying screens and the film.



8. *Standard 5 by 7-inch film showing the four temporomandibular joint views.*

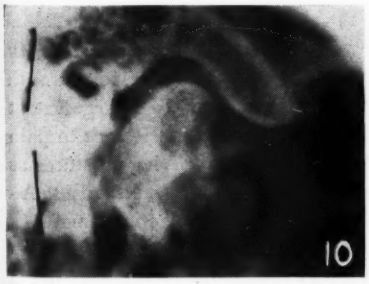
Composition of Mask—The cassette mask consists of a sheet of 1/16 inch lead, with one quarter cut out, cemented between two ¼-inch sheets of Plexiglas.® A friction fitted plastic ear plug aids in defining the position of the cassette relative to the area being radiographed. It is reversible for right and left positions (Fig. 6).

Position of the Cassette — Mask Combination—This is determined by the zygomatic process, the angle of the mandible, the lower border of the mandible, and the ear plug.[4] The position is thus standarized for each patient (Fig. 7).

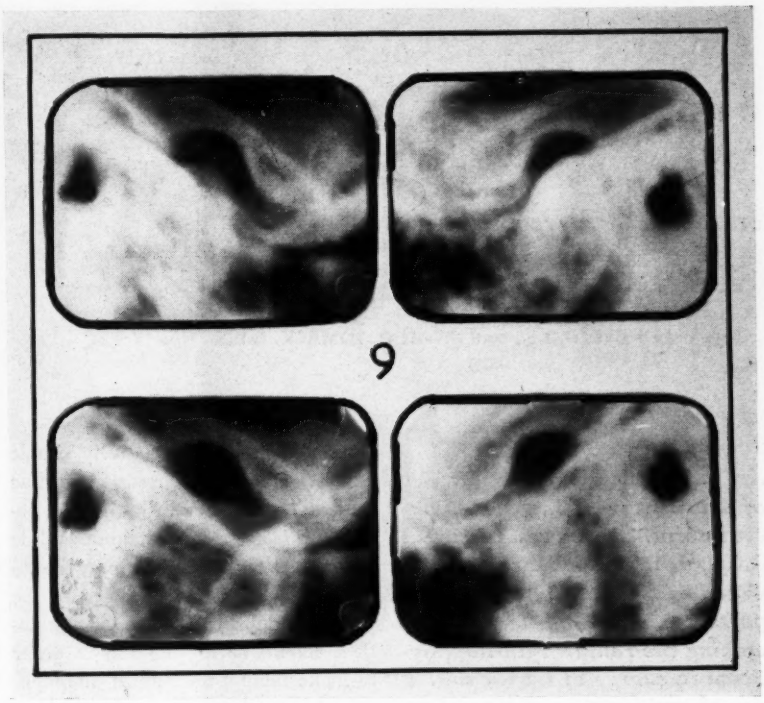
Exposure Time

The exposure time for temporomandibular radiography with the aperture in its normal position is 6 to 8 seconds for adults with the following factors: Eastman High Definition intensifying screens, Eastman Blue Brand film, 10ma and 70KV, field 2½ inches. (If the field is approximately 5 inches, the exposure time is 3½ seconds.)

Increase in Exposure Time — Reduction of the effective radiation field requires an increase in either milliamperage or exposure time; the latter is more convenient to regulate. This is illustrated in Updegrave's 1¼-inch aperture and 3½-second exposure time. The increase in exposure time is inversely proportional to the aperture. The relationship between aperture and exposure time for the instrument is being studied.



10. *Superimposed films taken at different times.*



9. *Views cut out and mounted in a standard dental x-ray mount.*

Secondary Radiation Factor—In collateral experiments in periapical and bitewing radiography it was found in one x-ray machine that reduction of the aperture to ⅞ inch at the base of the cone required doubling the exposure time to produce the normal film density. Seemingly, secondary radiation is an important factor in dental radiography and is related to exposure time and definition.

Use in Stereoradiography—The device lends itself to stereoradiography of the temporomandibular joint. Results will be reported later.

Identification, Mounting And Viewing of Temporomandibular Radiographs

The series of four radiographs for each patient are numbered from one to four using lead figures held on the cassette mask with scotch brand tape (Fig. 8).

Example of Record—As the exposures are made, a record is kept as follows:

1. R. Closed position
2. R. Bite plane position
3. L. Bite plane position
4. L. Closed position

Cut-outs of Joint Areas Useful—In studying postural changes in the temporomandibular joint the author has found it expedient to cut out the joint areas, using a clear periapical film as a template. The cut-outs, held on a suitable film mount (Fig. 9), can be conveniently compared. They may also be mounted on Kodak Redimounts for projection in 35-millimeter apparatus.

1 *Johnson Avenue*

ORAL SURGERY *Procedures in the Hospital*

LOUIS WILLINGER, D.D.S., and IRWIN G. TOMACK, D.D.S., New York

DIGEST

An increasingly greater number of dentists are taking postgraduate internships and residencies in hospitals in order to extend their dental education. They amass important clinical knowledge while making the rounds with the physician in charge of ward cases. A dental residency in a large hospital also frequently includes several months of training in anesthesiology. The trend in modern practice is to render a safer, more complete and improved health service by hospitalizing patients.[1] After becoming accustomed to operating on a patient in the Trendelenburg position the dental surgeon will find it more suitable than the dental office chair. This article discusses the specific advantages gained by hospitalization for dental operations in patients having other health complications.

Oral Surgery Classifications

As in other fields of surgery, oral surgery procedures may be classified as minor or major. The layman is inclined to believe that lengthy operations performed in a dental or medical office are of a minor character, while minor operations in the hospital are considered of a more serious nature and of major importance. The fact is, however, that while an extraction of a tooth in a healthy person obviously is minor surgery, a relatively simple extraction for a hypertensive cardiac patient, complicated with diabetes, becomes a serious undertaking. While the extraction per se is minor, the total procedure is complicated by the combination of conditions. Such a patient should be hospitalized in order to make laboratory studies of blood, urine, and other examinations which may be necessary before surgery.

Typical Case History

A cardiac patient was recently referred for the treatment of an acute alveolar abscess. Examination revealed respiratory difficulties and toxic indications. After conference with family members this patient was hospitalized.

Results of Examination—Urinalysis in this case revealed a plus four sugar content. With this knowledge surgery was postponed until a complete blood sugar analysis was obtained. The results of these tests disclosed that the patient had a severe diabetic condition and required insulin therapy. She was treated for this condition by the resident physician and four days later was sugar free. During this period she received antibiotic therapy for the acute infection and sedation for the control of pain.

Possible Coma Averted—Had the surgery in this case been done in the dental office it is possible that the patient might have lapsed into a state of diabetic coma.

Selecting Patients for Hospitalization

1. Patients revealing a history of serious illness, for example, cardiac disease, hypertension, or diabetes should be hospitalized for surgery.

2. Where there is a history of excessive bleeding after extraction of teeth it is imperative to obtain a red and white blood cell and platelet count, bleeding time, and blood clotting time before surgery is started. The hematologic study may reveal a serious blood dyscrasia, necessitating the postponement of the surgery.

3. Alcoholic subjects and narcotic addicts can be more easily managed in the hospital where surgery can be completed with minimum difficulties. Special preoperative and postoperative care aids in a rapid recovery.

4. Mentally defective, psychotic, and noncooperative patients are best treated in the hospital with little or no stress for the surgeon.

5. The extremely nervous patient requiring extensive oral surgery procedures can be best cared for in the hospital where he is given adequate preoperative medication to establish a calm mental state.

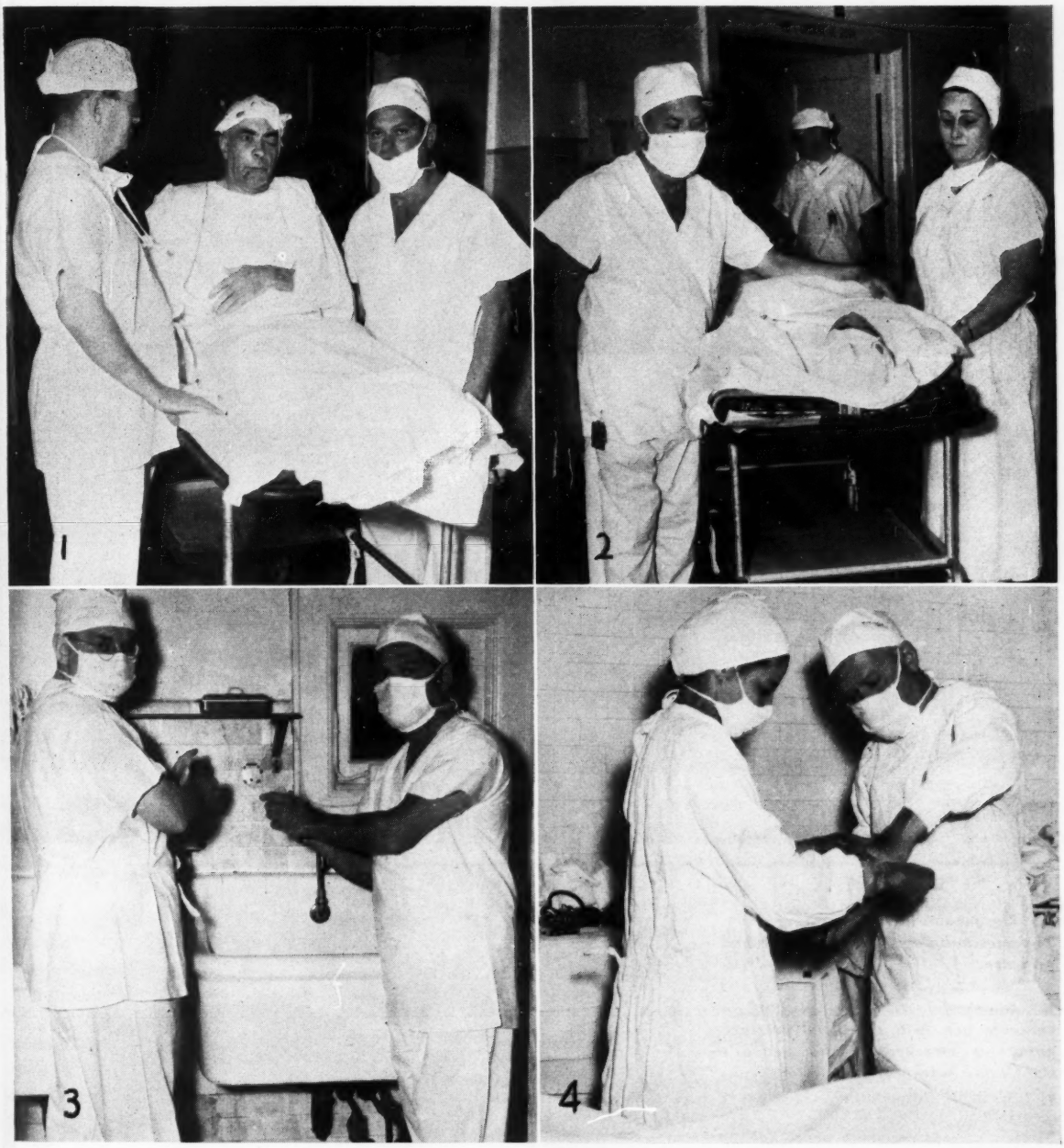
Indoctrination of Patients

Fear of pain, always associated with dental treatment, is to a large extent justified. Fear, and resistance to pain are inherent in all living creatures as parts of the defense mechanism. Although pain control still remains a problem not completely solved, its mastery contributes enormously to the dental practitioner's prestige and success.

Experience in the hospitalization of patients reveals that the majority are willing to cooperate. A smooth, soft-spoken professional approach generally produces a favorable response. It is well to emphasize the following facts:

1. There will be absolute freedom of pain.

[1]Willinger, Louis: When the Dentist Operates in a Hospital, ORAL HYGIENE **43**:477 (April) 1953.



1. ***The patient is brought to the operating room where he is met by the surgeons.***

2. ***Surgeon and nurse reassure the patient.***

3. ***Surgeons scrubbing before operation. Note cap and mask.***

4. ***Nurse assisting surgeon with sterile gloves. Note sterile surgical gown worn by surgeon.***

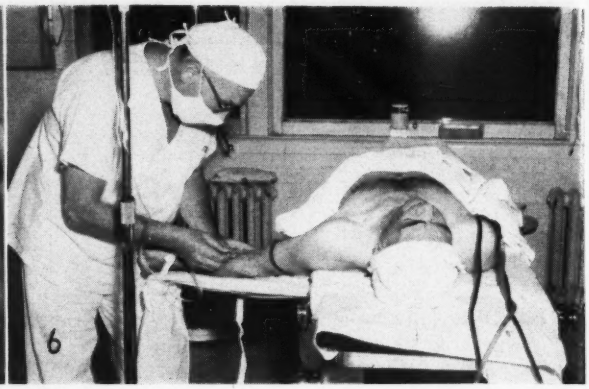
2. The entire surgical procedure is much safer when performed in the hospital.

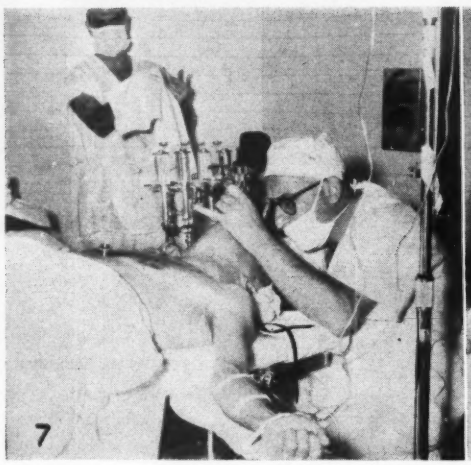
3. Preoperative medical checkup with laboratory studies will be obtained.

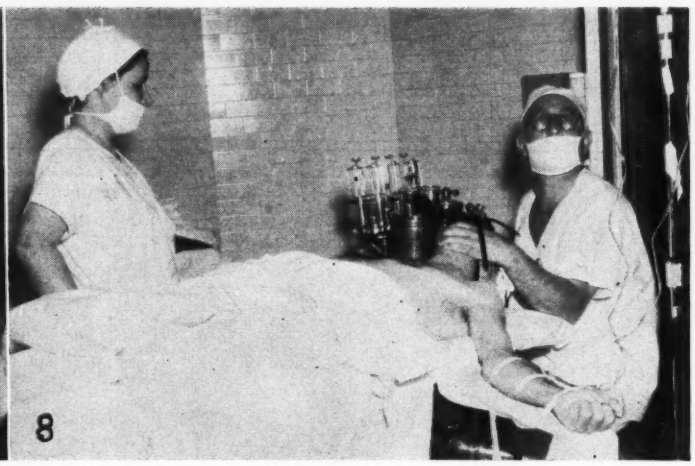
4. The efficiency of the trained personnel in the operating room assures a more satisfactory result.

5. Modern, balanced anesthesia and the services rendered by a specialist in this field who frequently checks blood pressure, pulse rate, heart action, and respiration during the administration of the anesthesia are important advantages.

6. The immediate bed rest imposes less strain on the organism and the postoperative care in the hospital is usually better than the service that can be given at home.







5. ***The patient in the operating room. The anesthesiologist is taking the blood pressure.***

6. ***Anesthesiologist accomplishing a venipuncture. Note the blood pressure apparatus attached to the patient's right arm. Note position of stand containing pentothal sodium.***

7. ***The patient receiving pentothal sodium and anectine. Anesthesiologist accomplishing insertion of nasotracheal tube by direct vision. The anesthesiologist is using the laryngoscope.***

8. ***The patient is receiving anesthetic mixture from apparatus on the right side of the anesthesiologist.***

9. ***The patient's head and body are draped with sterile sheets and he is receiving anesthetic mixture. The anesthesia apparatus leading to the nose is not visible. The throat is being packed. Note sterile clip attachments to keep drapes in position.***

---

7. A majority of patients today have some form of hospitalization insurance. This type of insurance generally pays all or part of the expense of the hospital bill. It must be ex-

10. *Ligation of the external cartotid artery is accomplished prior to removal of the intraoral tumor.*

11. *Intraoral operation is begun. Staff of surgeons are operating. Note suction apparatus.*

plained, however, that hospitalization insurance does not pay the dental surgeon's fees.

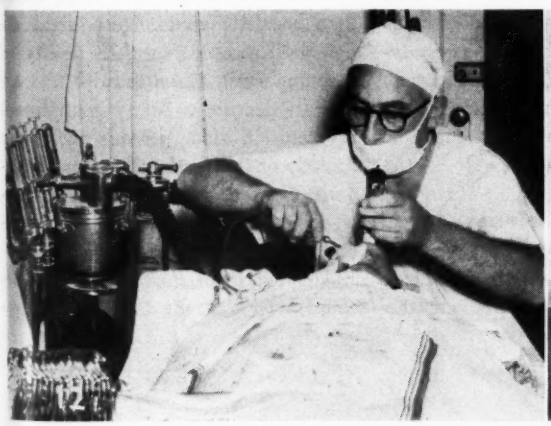
Summary

1. Protracted or involved oral operations are better accomplished and with a greater degree of safety in the hospital.

2. A dentist's prestige is enhanced both by his professional colleagues and his patients.

3. Patients take a more serious attitude and will better appreciate the value of the services rendered.

4. The dentist is enabled to establish a closer relationship with the physician who will have the opportunity



12. *Operation completed. Anesthesiologist extubating patient and using laryngoscope and suction.*

13. *Lumbard airway is inserted in the mouth of the patient. Note that the patient is receiving fluid in his left arm.*

14. ***The patient is in his room after the operation recovering from the anesthesia. Note side arms of bed.***

to observe that dentists are familiar with medical procedures and surgical techniques in the hospitalization of patients.

5. It is suggested that dentists take their patients whenever indicated and whenever possible to the hospital in order to render a more efficient and complete health service.

6. In this era of specialization it is possible that in future some dentists will confine their professional activities entirely to hospital practice. This can be done after a dentist has received postgraduate training in a dental or medical school with hospital affiliations where he has learned accepted techniques and methods.

7. Many recent dental graduates have availed themselves of the opportunity offered for internships and residencies.

8. Practicing dentists can obtain modern hospital procedures by becoming affiliated with the staff of a dental clinic of a city or voluntary hospital. This will enable them to continue to maintain their dental practice and at the same time learn hospital operating room methods.

355 *East* 149th *Street*

The Mouth in Diagnosis

FOR CENTURIES inspection of the tongue has played a part in the art of diagnosis, but only recently have serious attempts been made to investigate the normal and abnormal appearances of the tongue's surface and to provide a photographic record of such appearances. Observations of characteristic changes in the mucosa of the tongue in the presence of various deficiency diseases have led us to repeated inspection of the tongue in order to detect signs of malnutrition.

Significance of Changes in the Oral Tissue

Although the importance of nutrition in everyday diagnosis and therapy is emphasized, the significance of changes in the oral tissues deserves still more consideration. Changes in the color of the lips and the oral and pharyngeal mucosa often are sensitive indicators of systemic disturbances and may exist long before more severe signs and symptoms appear elsewhere in the body. In the control of dental caries, the most prevalent disease of childhood and adolescence, many lesions are overlooked. Dental caries, periodontal disease, and artificial dentures present special problems and will be discussed briefly.

Nutritional Problems in Older Persons

Many physicians, pediatricians, and dentists do not fully appreciate the role of the fermentable carbohydrates in the dental caries process. Many physicians caring for the aged do not fully appreciate how periodontal disease and artificial dentures may reduce the efficiency of natural dentition, nor do they realize that many artificial dentures have little more than cosmetic value. Nutritional deficiency states decrease the ability of the supporting tissue to adjust to artificial dentures. Many nutritional problems in older persons are either directly or indirectly related to inadequate mastication resulting from poorly constructed or poorly fitting dentures.

Adapted from *Postgraduate Medicine* **17**:13 (March) 1955.

Dentistry Is BIOPHYSICS—*Part Two*

EDWIN S. SMYD, D.D.S.,
Detroit

DIGEST

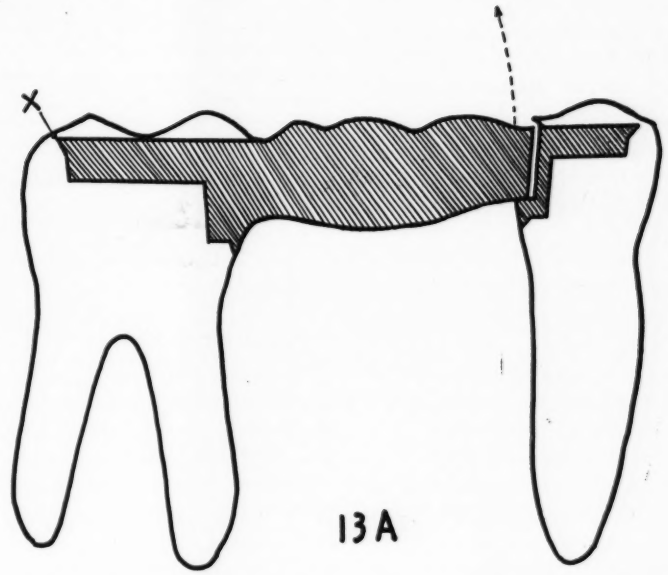
In this installment, the second of a two-part article presenting the biophysics of dentistry, the author discusses torque in bridge construction. Answers to questions that are often difficult to solve are given and biomechanical problems are illustrated.

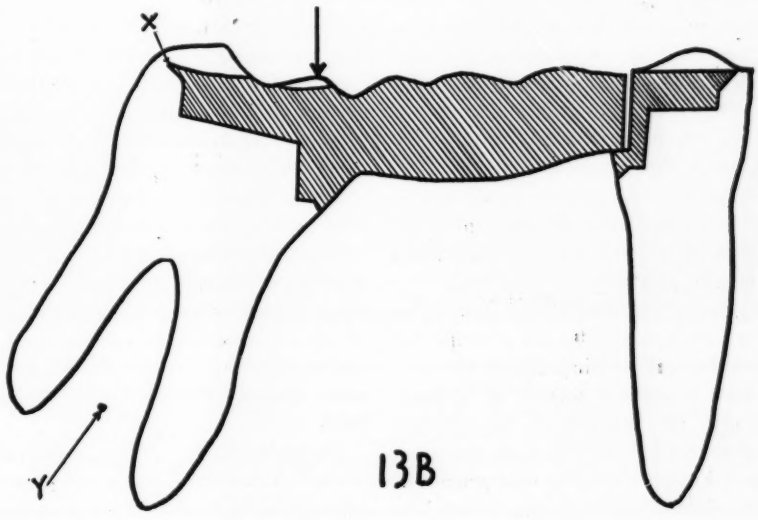
Torque

Bridge Torque — Torque is force acting through a moment arm which produces rotation about a given axis or fulcrum. When torque twists a body, the deformation is called "torsion." Teeth and prosthetic structures are subjected to torsion in a variety of ways during mastication.

Result of Negative Forces — The simplest example of torque is that which occurs when a patient chews sticky food with a supported cantilever bridge. Figure 13A shows that the resultant of negative forces acts to pry the bridge cantilever off the primary abutment. Rotation occurs on X as the center of fulcrum.

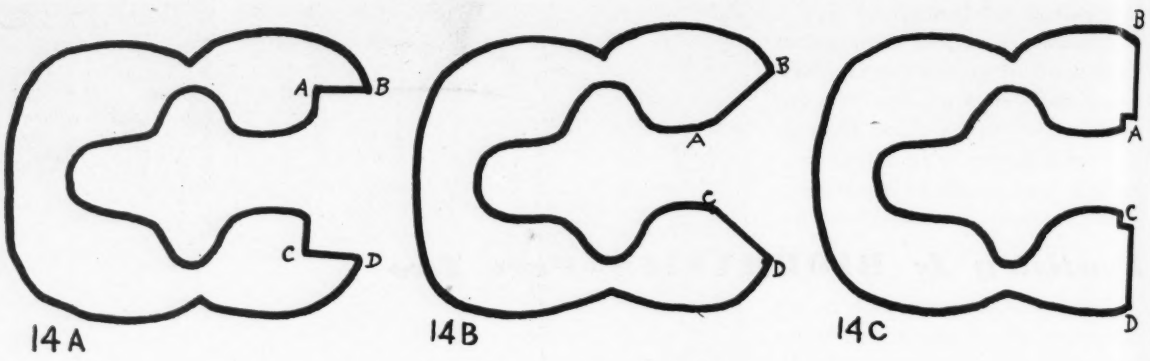
Effects in Positive Phase of Masticatory Effort—If tough food (crust of bread) engages the cusps of the primary abutment, momentarily, heavy stress may be borne by this tooth which will act to depress or rotate it on its axis of rotation in the bone, Y, of Figure 13B. The bridge structure and the secondary abutment may be completely out of occlusion during this instant. The secondary abutment supports the cantilever against the de-





13A. ***"Negative" intermaxillary torque produced by chewing sticky food with a supported cantilever bridge.***

13B. ***Mesiodistal intermaxillary torque established as a result of "positive" occlusion through a tough morsel of food on the unground cusps of the primary abutment.***



14A. ***"Box" type cavity with opposing walls and little taper affords best cement bond at the flange.***

14B. ***Black's cavity has diverging proximal walls.***

14C. ***Slice type cavity has proximal walls set at 180° to each other.***

pression of the molar and in effect twists the cantilever off the molar in exactly the same manner as that shown in the preceding illustration but the forces acting will be much more powerful.

What will restrain the bridge from being pried off the primary abutment?

Resistance Forms — Analyzing the resistance units (Fig. 14) of a proximocclusal primary abutment to torque from the above cause the following is evident:

1. Box type preparation (Fig. 14A). Bond between the proximal flange and the tooth. Black's preparation (Fig. 14B) is nearer ideal (Fig. 14A) than slice preparation (Fig. 14C). The extreme slice preparation has flange walls set at 180°.

2. Isthmus. The isthmus is small, tapered, and only as effective as the cement around it is to shear. Since the torque of the cantilever is powerful, the resistance of the isthmus is not significant.

3. Dovetail. This is the most important factor maintaining retention. It can be easily proved, however, that the dovetail loses all mechanical resistance to displacement if it has much taper or "draft."

Test of Mechanical Retention—Figure 15 demonstrates the principles of mechanical coupling. Figure 16 represents a sagittal section at a plane where the dovetail of the primary abutment is locked in tooth structure, and Figure 15B is an enlargement of the dovetail area at this plane. The model used for Figure 15 B is made of plywood. A hole is drilled at midpoint, Figure 15A, into the upper edge of the block, which represents the dovetail, to receive the spring-wire rod which is used to put torque on dovetail A. Figures 15C and 15D are similarly prepared.

Effective Coupling to Resist Torque —Figure 15B demonstrates by the deflection of the rod that a dovetail with no pitch is effective coupling to resist torque set up by the counterclockwise movement of the rod.

Rotation—Figure 15D demonstrates that a dovetail with the pitch shown by dovetail B will rotate freely to the same force upon a fulcrum established at X.

Figure 15C illustrates that a dovetail with the degree of pitch shown by dovetail C is also effective in resisting counterclockwise torque.

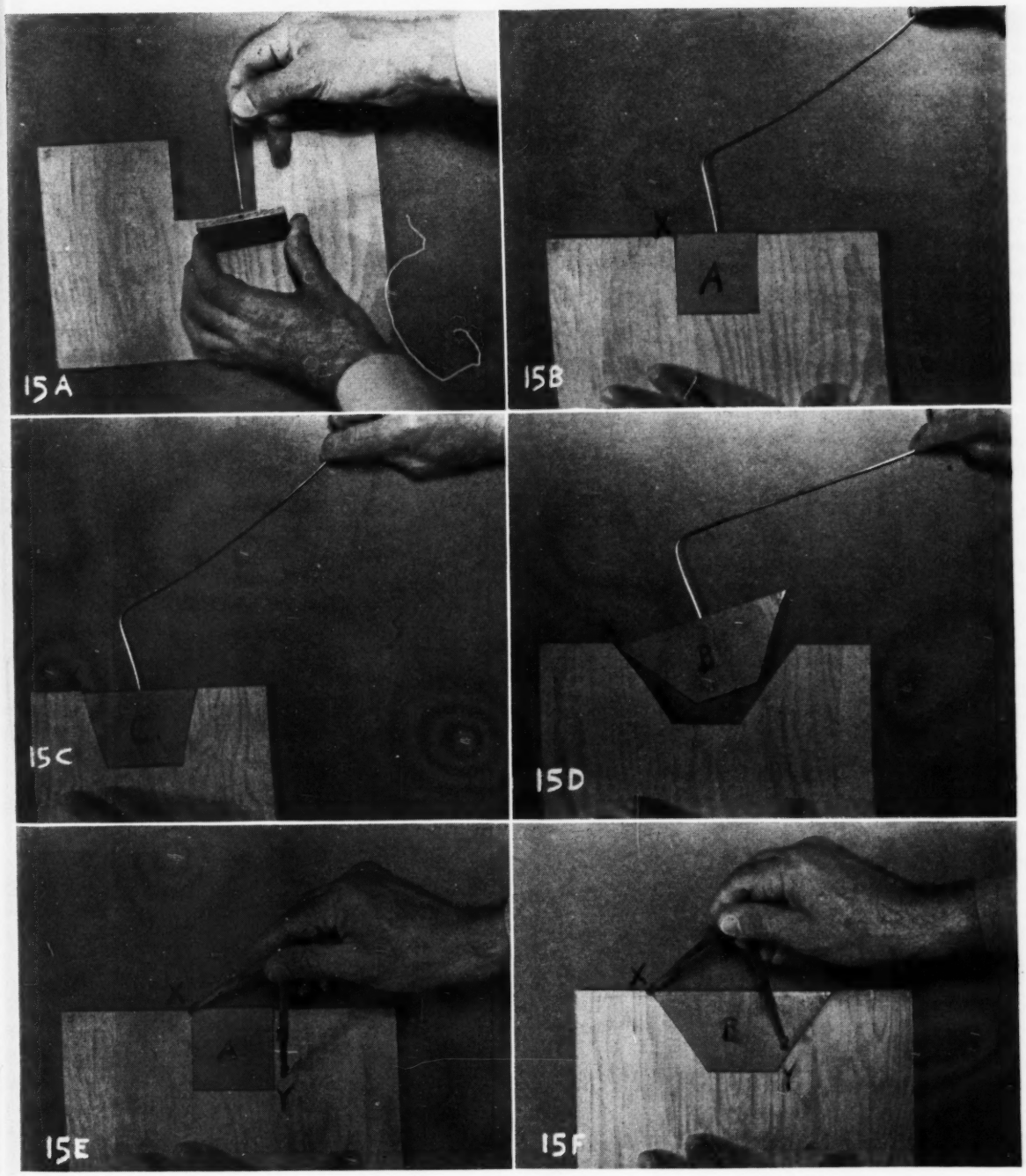
Tool to Analyze Pitch—This experiment demonstrates the fact that for a given fulcrumage (X in each of the above cases) there is a critical pitch which cannot be exceeded without sacrificing mechanical resistance, but, most important, the experiment furnishes a tool which has general application and can be used to analyze any case diagrammatically for critical pitch.

Example—If the divider is placed at the fulcrum and the point of greatest rotation of the dovetail opposite is used to establish a radius, Y, (Fig. 15E) it can be seen at a glance whether the critical pitch has been exceeded or not by the arc struck from these points. If the arc passes through tooth structure, (Fig. 15E) the dovetail has mechanical resistance; if through the inlay or cement, (Fig. 15F) it does not.

Practical Significance—If the bridge ended at X, (Fig. 16) the dovetail would provide mechanical coupling as borne out by arc XA which passes through tooth structure. Good operative technique requires extending the inlay to include all of the occlusal fissures. When the primary abutment terminates at Z, however, the pitch of the dovetail becomes more critical, and a dovetail with the pitch illustrated is mechanically deficient to resist the torque as borne out by arc ZA. In Figure 17 it can be seen that reverse beveling of the gingival floor is also ineffectual.

Corollary Developed—Assume that the dovetail would be square—cut enough to provide effective mechanical coupling for the cantilever bridge shown in Figure 13B and, to make the illustration as extreme as possible. that the primary abutment is prepared as a slice preparation so that little bond exists between the proximal flange and the cavity walls. Since the isthmus is the most necked-down and, therefore, weakest part of the bridge structure, is it not conceivable that, when heavy force is borne by the unground cusps of the abutment tooth, the tooth may be depressed on its axis of rotation and *bending* can occur across the isthmus?

Bending Occurring Across Isthmus —When operative measures are not at fault, undoubtedly, bending is responsible for the recurrent caries sometimes seen under the gingival margin and along the axial surface of the flange of the primary abutment



15A. *"Close-up" of model construction.*

15B. *When fulcrumage occurs at x, a dovetail with no pitch is effective in resisting torque.*

15C. *Dovetail with this pitch does afford mechanical coupling.*

15D. *This dovetail affords no mechanical coupling*

15E. *Experiment establishing the use of the radius for the determination of critical pitch.*

15F. *Experiment establishing the use of the radius for the determination of critical pitch.*

casting, even though the bridge may still be tight to testing. Emphasis is once again placed upon the need for external bracing of the isthmus and flange which is ideally done in the three-quarter or complete crown preparation. Where the proximocc.usal abutment is to be used as a primary abutment, the bucco- and linguoaxial line angles of the box should be grooved to provide mechanical coupling of the flange.

Lingual or Buccal Groove Aids Resistance Form—The study of bridge deflection has shown that a fulcrum occurs at the intersection of the neutral axes of the proximal flanges with the neutral axis of the beam. Figure 18 shows by arc analysis that the pitch of the dovetail walls becomes extremely critical to offset displacement by this kind of force. The diagram reveals clearly how placement of a lingual or buccal groove aids resistance form.

Biomechanics

1. Why do lower lingual bars settle into the lingual tissues when lower partial dentures are worn over a long period of time?

2. Why do anterior bars of double-barred upper partials settle into the tissues while the posterior bars drop away from the tissues?

3. Why do orthodontic cases regress after treatment?

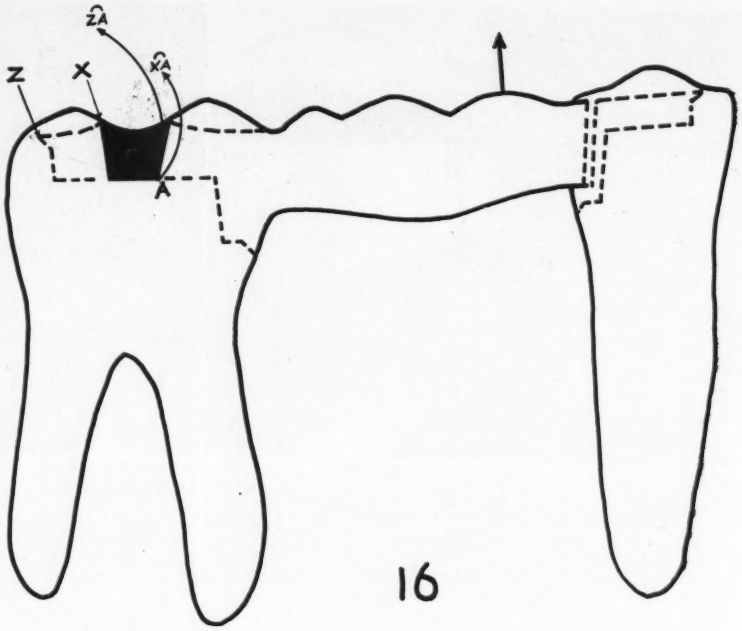
4. Why do complete upper and lower dentures "tick" forward when the patient closes firmly in centric occlusion?

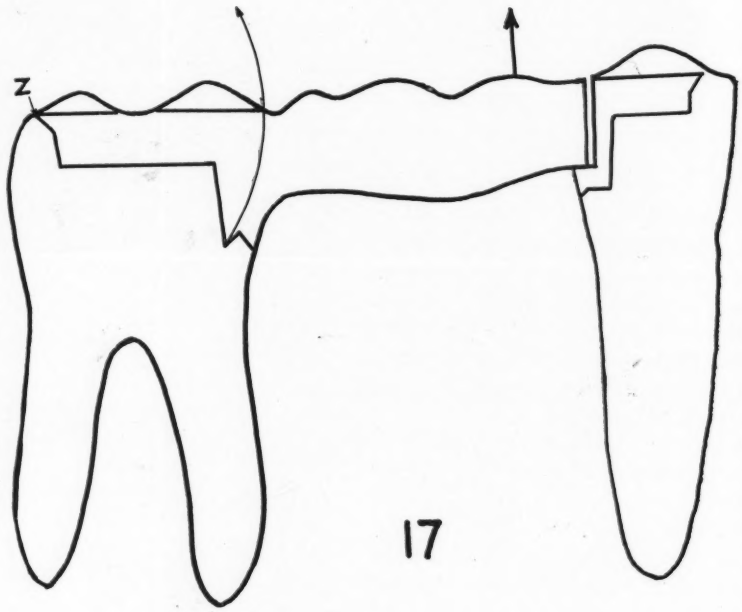
Rotation and Torque—These terms explain much of dental physiology and dental disease as well. These terms have importance not only to the general practitioner but also to the dental specialist. Rotation and torque are responsible for maintenance of interproximal contact ("mesial drift") and also for degeneration of investing tissues and tooth exfoliation.

Physiology of Investing Tissues—It is known that excessive horizontal force applied to a tooth produces bone resorption and breakdown of the periodontium where compression takes place. A single-rooted tooth turns on an axis of rotation, a, as shown in Figure 19A, to horizontal force, b.

Physiologic Factors—1. Only the fibers on the tensed side are resisting the force well because the fibers on the other side are being compressed.

2. The resistance of the tensed fibers becomes progressively less as points are taken closer and closer to the axis of rotation because displacement of the tooth is proportional to the distance from the axis.





16. ***Demonstration of the critical pitch of the dovetail with respect to the fulcrum.***

17. ***Reverse beveling fails to provide mechanical coupling to torque when the fulcrum occurs at Z.***

3. Tension of the periodontal fibers occurs on the *opposite* side of the tooth from the axis of rotation to the root end but in reverse order.

4. Since the axis of rotation is in the apical third of the root, the periodontium of the root end is under mechanical disadvantage to oppose horizontal force on the crown.

Resistance to Horizontal Force—Multirooted teeth are better prepared by nature to resist horizontal forces.

[5]Smyd. E. S.: Bio-mechanics of Prosthetic Dentistry, J. Pros. D. **4**:368-383 (May) 1954.

Figure 19B illustrates how a lower molar reacts to distal thrust:

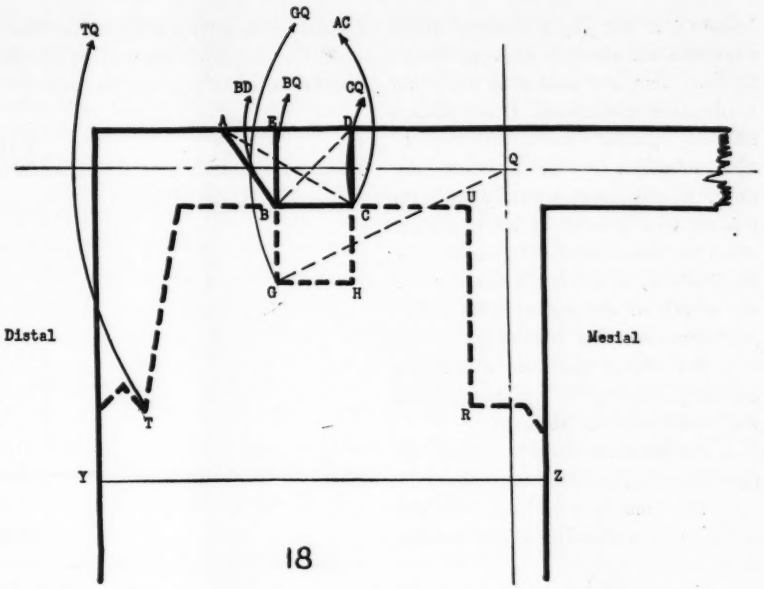
1. Mesial root goes up.
2. Distal root goes down.
3. Rotation occurs on a center *in the bone septum between the roots.*
4. *Translation of the roots takes place.* This has been inadequately appreciated. *This fact makes it possible to use dental investing tissues at higher capacity.*
5. The translation places more periodontal fibers in tension; the purity of tensile stress on the periodontium is a function of the radius of rotation.
6. It apparently makes little difference whether tension of the periodontium arises from upward or downward movements of the roots. An upper molar tooth is rotated both ways in "working" and "balancing" bites.

A Couple—A couple is a pair of equal paralleled forces, acting in opposite directions but not on the same point (Fig. 20A). A couple produces torque whose *moment is equal to the product of one of the forces times the perpendicular distance between them.*

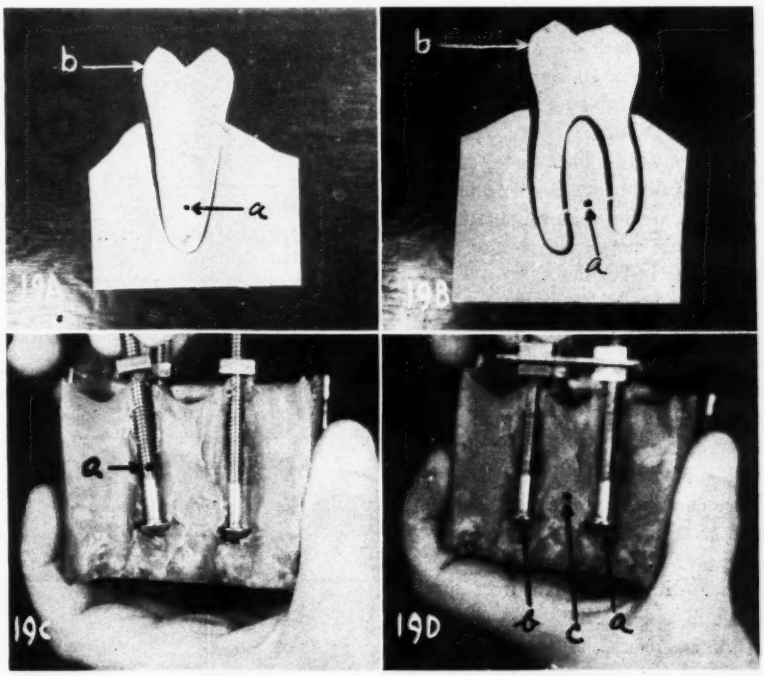
Practical Significance—Horizontal forces applied to teeth produce torques which the roots and investing tissues must resist. At equilibrium the torque of the horizontal force must be equal to the torque produced by the couple in the root structures. From Figure 20B it is seen that the following is true:

1. $Fh = P \cdot 2R$ where F = horizontal force
   h = moment arm
   P = paralleled forces of couple
   R = radius of rotation
2. If Fh stays constant as the radius increases, the forces, P, exerted on the periodontium must diminish to keep the equation in balance.
3. Not only are *more fibers* put in *tension* when the orbit of rotation is increased but the *force, P, sustained by the periodontium, is reduced.* In other words the root structure gains mechanical advantage.

Experimental Proof—While the investing tissues of the teeth are not



18. ***Diagram summarizing the critical pitch of the dovetail when torque produces fulcrumage at A, D, or Q.***



19A. ***Schematic model of single-rooted tooth to demonstrate axis of rotation, a, to horizontal thrust, b.***

19B. ***Model of multirooted tooth demonstrating axis of rotation in bone septum between roots.***

19C. ***Individual post in Korogel turns on a hinge axis of rotation like a single-rooted tooth. Center of rotation at a.***

19D. ***Abutments of "bridge" turn on an axis of rotation in Korogel between the "roots" as does a lower molar.***

"elastic" in the physical sense which expresses deformation as proportional to load, they are elastic in the usual application of the word. If one pushes laterally against a tooth with reasonable retention in the alveolus, the tooth is displaced laterally and rebounds to a greater or lesser degree when the instrument is removed. The elasticity is, of course, a function of the health of the periodontium. The procedure was the following:

1. A material was used which had elasticity (Korogel) and stove bolts were used as tooth analogues.

2. The head and threads of the bolts provided "periodontal attachment."

3. The bolts had uniform size and length; and Korogel, uniform consistency.

4. Measured horizontal loads could be applied to determine mathematical relationships suggestive of a mechanical system.

Tooth Movements Similar to Rotation of Straight Objects—Figures 19C and 19D show that the laboratory specimens reacted exactly as it is known that teeth do. The movements of teeth in their sockets are typical of straight objects rotating through a semisolid medium:

1. By studying the hole left by rocking a post embedded in soil back and forth before its removal, the kind of rotation described for a single-rooted tooth may be verified.

2. If two corks are attached to opposite ends of a needle and the assembly floated in a glass of water, to eccentric vertical loading or (if the corks are restrained from translation) to eccentric horizontal force, one cork will submerge while the other rises. The center of this rotation occurs between the corks.

Figure 21A, The Experimental Model—Horizontal loads were applied through a ball chain and pulley to minimize frictional losses. The rotations of the various tests were recorded by the movement of a pointer against a millimeter scale.

1. The loads were applied on individual posts (Fig. 21B) then on "bridges" attached between the posts (Figs. 21C and 21D).

2. The bridges were all multiples of unity and unity was 12 millimeters.

3. The angle of application of the horizontal force was varied from 90° to 0° (Fig. 21E).

The five tables give the results of the experiment:

TABLE I

POST NUMBER	ROTATION OF POINTER (M.M.)
1	15.0
2	12.5
3	11.8
4	12.0
5	14.0
6	13.0
7	11.5
7	89.8
	12.8 mm. average rotation

TABLE II

POST NUMBER	MM. BETWEEN CENTERS	ROTATION OF POINTER (MM.)
4 & 5	12	8.0
3 & 4	24	6.0
2 & 3	36	5.5
1 & 2	60	6.0
1 & 6	84	6.0
1 & 7	120	6.0

TABLE III

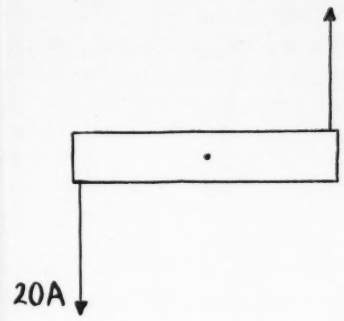
	UNITS					
	1	2	3	5	7	10
MM. between post centers	12	24	36	60	84	120
MM. rotation of pointer at 175 gm. load	10	5¾	3¾	2 4/5	1½	⅞
Calculated rotation	10	5	3⅓	2	1 3/7	1

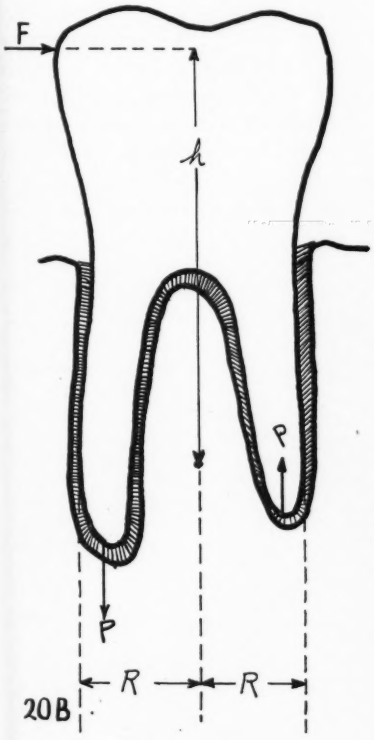
TABLE IV

ANGLE OF APPLICATION OF HORIZONTAL FORCE	MM. ROTATION OF 36 MM. BRIDGE
90°	5.5
60°	4.6
45°	4.1
30°	3.9
0°	3.7

TABLE V

ANGLE OF APPLICATION OF HORIZONTAL FORCE	MM. ROTATION OF 120 MM. BRIDGE
90°	6.0
60°	4.0
45°	2.4
30°	1.3
0°	0.9





20A. *A couple.*

20B. ***The torque Fh of horizontal force is resisted by the couple P·2R of investing tissue support.***

Stability or Resistance to Rotation—With one exception when the loads were applied at 90° to the bridge span, (Table II), the "give" of the bridge is about half that of the individual tooth (Table I). This value is constant whether the abutments are close together or far apart.

When the load is applied in line with the abutments, that is, at 0°, (Table III), the distance between the abutments is important:

1. At 12-millimeter centers, the abutments were rotated 10 millimeters
2. At 120-millimeter centers, the rotation was 7/8 millimeter.
3. The "give" (this is a measurement of force, P, of the illustration) of a bridge foundation varies inversely as the bridge span.

From the formula $Fh = P{\cdot}2R$

$$Fh = P$$
$$2R$$

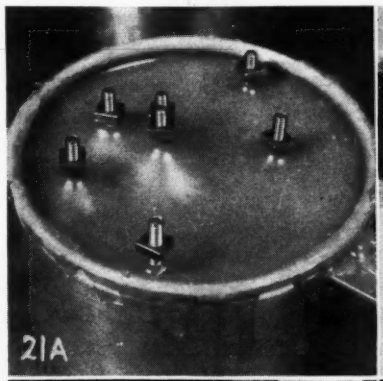
Where $Fh = 1$, $P = 1$

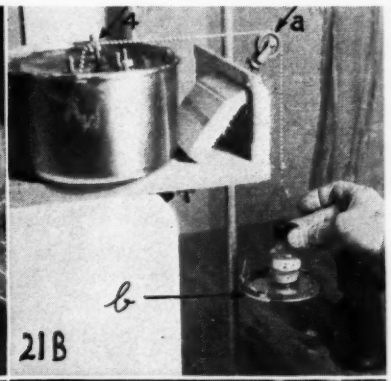
$$2R$$

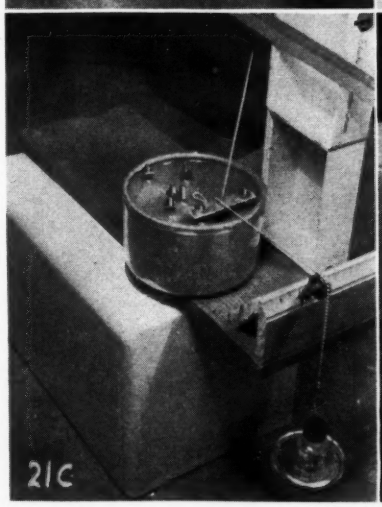
4. Putting it the other way, the stability or resistance to rotation varies directly as the radius or, specifically, 2·R.
5. When the horizontal loading is applied at an angle to the bridge span, (Table IV and V) the foundational stability varies as the *effective* radius of rotation of the abutments.

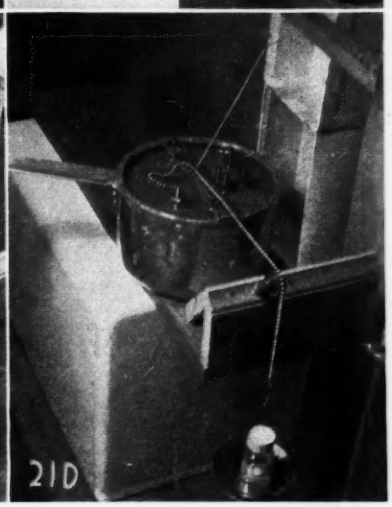
Horizontal Forces Applied at Various Angles—Figure 22 illustrates that horizontal forces are by "conventional" concepts of mastication applied at various angles from 90° to 0°. If the view is taken that the brunt of mastication is done mainly in the vertical effort (Boswell, Jankelson, Kurth,) concentrated loads are shifted anteriorly and posteriorly to the axis of rotation of fixed bridgework during the comminution of the bolus. This is equivalent to horizontal loading applied at 0°.

Rationale of Treatment—Since human teeth of either jaw exhibit arch







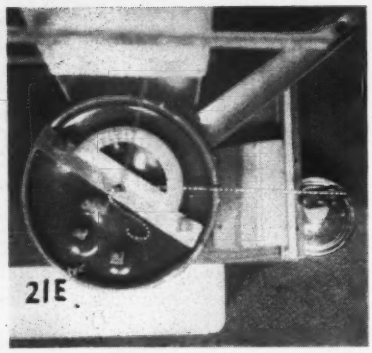


21A. ***Close-up of experimental specimen with bridge ties removed. Posts are arranged to produce bridges with radii of 1, 2, 3, 5, 7, and 10 units of length.***

21B. ***Experimental assembly with test being run on individual post No. 4.***

21C. ***Horizontal force applied at 90° to bridge."***

21D. ***Horizontal force applied at 0° to bridge span.***



21E. ***Horizontal force applied at 30° to bridge span.***

form, for each half-jaw the vertical axis of each tooth anterior to a given tooth will be medial (with respect to the median sagittal plane of the body) to the posterior one. For this reason when any two teeth are firmly united as by splinting inlays or fixed bridgework, the foundational stability of both teeth is greatly enhanced because rotation in response to horizontal thrust must take place on a center *between* the roots of the two teeth. One tooth moves down under the thrust, the other up, depending upon which side of the center it happens to be.

Foundational Stability or Leverage is Gained—In certain of the mandibular movements, the foundational stability of such teeth increases arithmetically; in other movements the mechanical advantage of leverage is gained. When posterior teeth of both sides of either the mandible or the maxilla are firmly united in a fixed prosthesis, (1) the center of rotation is at a considerable distance from the abutments, (2) the translational effect of the roots becomes more pure, and (3) the periodontal membrane of each entire root is called into play. The experimental data substantiate this view.

Practical Significance — Prostheses which utilize fixed abutments separated by long distances should be extremely stable to horizontal forces in mastication. A fixed bridge which unites both cuspids and a molar tooth should be extremely stable to buccolingual as well as anteroposterior forces. Since such constructions are seldom undertaken due to the presence of anterior teeth, precision "attachment-type" bridgework, which approaches closest to the positive coupling of a fixed bridge, is the next best choice. When precision attachments are employed, the torque of a partial denture with cantilever saddle extension over one edentulous posterior region is effectively and safely taken by the cuspid and molar of the opposite side provided the case is rigid enough across the arch.

Rotation—If the turning of a phonograph record is studied (Fig. 23A) the following can be seen:

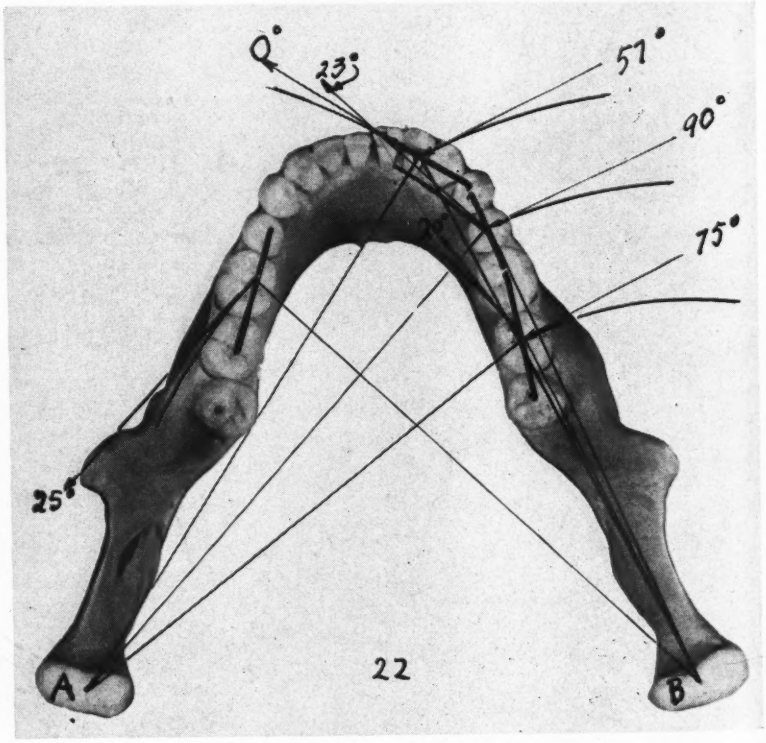
1. At a given instant tiny particles on the right side of the record are moving from top to bottom. At the same instant particles at the bottom are moving from right to left. Other particles on the left of the record are moving from bottom to top and still others from left to right.

2. The particles are constantly changing their direction of travel.

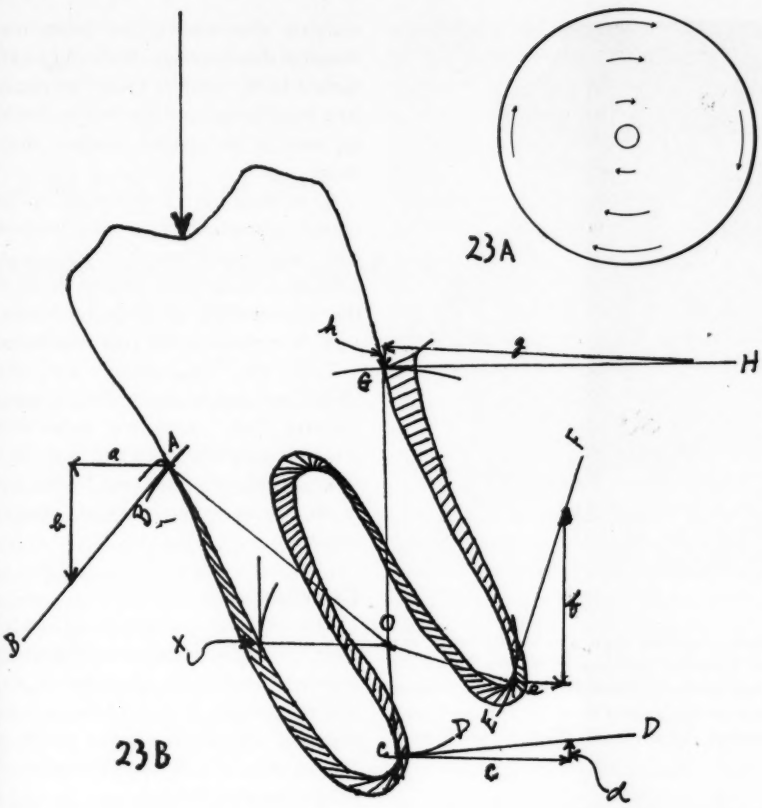
3. The velocities of the particles vary, being less as points are taken nearer center. At exact center the particle does not move whether the record turns or stands still. These are characteristics of all rotations and apply to the rotations of teeth in their sockets as well as to the rotations of the mandible.

Tooth Rotation—Tipped teeth are weakened prosthetic supports. Vertical forces on tipped teeth resolve into large horizontal components of force in the root structure. Even centric loading on a tipped tooth is in reality eccentric loading as can be seen in Figure 23B. Rotation occurs on 0 as center whereas if the tooth were perfectly straight, vertical forces concentrated in the central fossa would be directly over 0, and rotation would not occur.

Eccentric Load Resolved into Horizontal Force—From Figure 23B, it



22. ***Directions of horizontal forces applied to three bridges shown by heavy lines across the incisal edges and occlusal surfaces of the teeth. (1) Diagonal forces of 57°, 90°, and 75° are those applied against the upper teeth when the mandible moves from working bite to centric. (2) Diagonal forces of 0°, 23°, and 20° are those applied on the lower teeth when the mandible moves from balancing bite to centric. (3) Diagonal force of 25° is applied by lower bridge against upper teeth in movement from balancing bite to centric.***



23A. ***Analysis to show directions and velocities of discrete particles in rotating disc.***

23B. ***Resolution of horizontal force components in the root structure of multi-rooted tooth subjected to eccentric loading.***

can be seen that the eccentric load may be resolved by sector analysis into horizontal forces a, c, e, and g. Line BA is the tangent to arc BA and is therefore the direction of force acting at A. Similarly CD is the tangent to arc CD and is the direction of force at C. The vertical force component at C is not down but *up* because point C is to the right of center. Only at X is vertical loading on the crown of the tooth taken as pure vertical downward loading on the investing tissues. The other tangents and resolutions have been similarly drawn.

Mandibular Rotation — From Figure 24A, it can be seen that, disregarding for the moment translation of the mandible, since the saggital axis of mandibular rotation is not on the occlusal plane but considerably above it (0, Fig. 24A), centric contact of teeth must always produce an anterior thrust upon all the teeth of both arches. As the jaw opens, the teeth separate at varying velocities and describe varying directions of opening, since the arc of opening and closing for each tooth is different.

Common Movement in Varying Degrees—When the mandible closes, all the teeth have in common, although in varying degrees, a forward thrust as can be seen from the force components x, y, and z.

Reactive Forces in Centric Occlusion Anterior — Although translation of the mandible as it approaches centric occlusion sets up posteriorly directed forces on the upper teeth (when food is present between the teeth), the *reactive forces on the lower teeth by this act are anterior;* the powerful force of complete centric closure, when the condyles are completely retruded, is anterior on the upper teeth as well, as the illustration shows.

Anterior Force Inevitable—The anterior thrust of centric occlusion must always occur in human dentition because of the anatomy of the mandible. Pure vertical closure without anteriorly directed horizontal force components could only occur if the saggital axis of the mandibular rotation, O, of Figure 24B, were in line with the occlusal table of the teeth. Under these circumstances the tangents to the arcs of closure of all the teeth would be perpendicular to the occlusal table of the teeth.

Practical Significance — The forward thrust of the mandible together with mesial thrust developed by teeth rotations in their sockets to centric loading are largely responsible for interproximal abrasion of teeth and the maintenance of interproximal contact. The following results of these movements are noted:

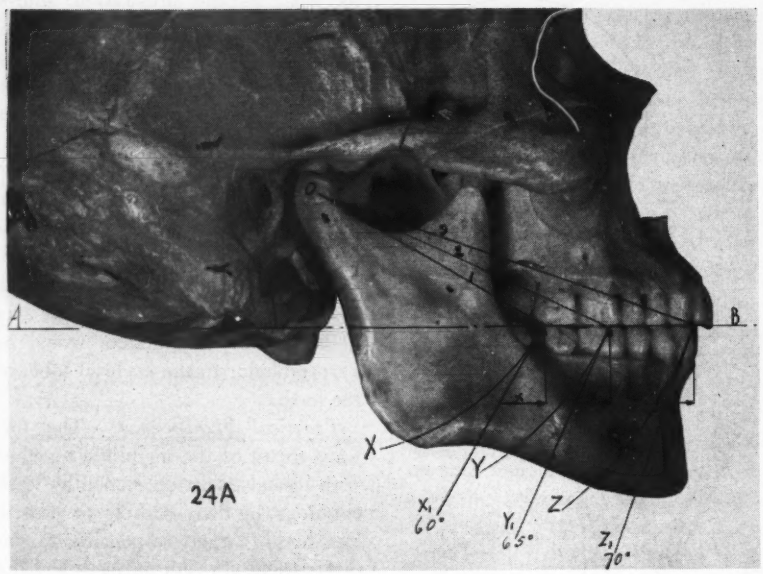
1. Teeth are *forced* by this combination of rotations into "mesial drift."

2. *Tipped teeth are exfoliated through use* when the buttressing effect of interproximal contact is broken by extraction.

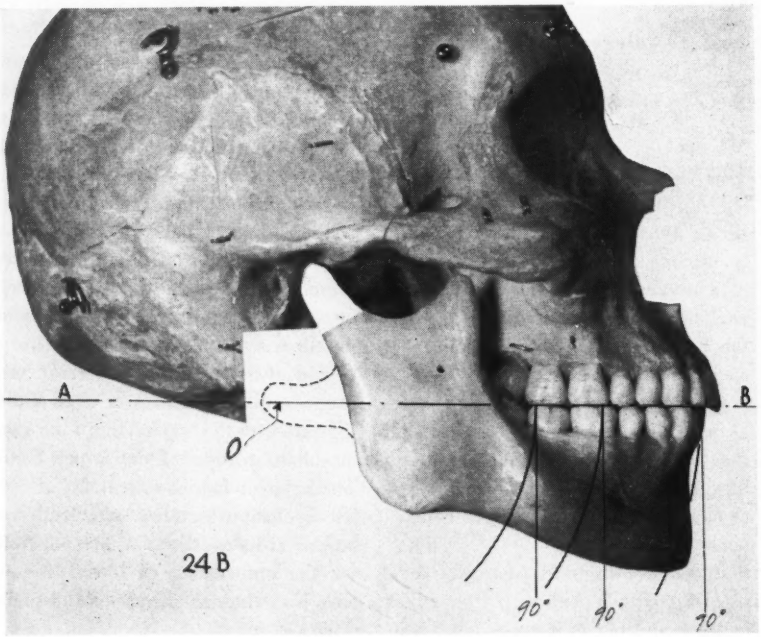
3. Periodontal disease, aging, and extractions of teeth destroy the balance of power between muscular torques and reactive torques of the investing tissues. When the investing tissues of the remaining teeth are used at their lowest capacity to take torque, mesial migration of the teeth is accelerated. This explains why the anterior bars of double-barred upper partial dentures settle into the tissues after a period of use while the posterior bars drop down. Because lower teeth interdigitate with the uppers, they follow the mesial migration of the upper teeth. The anterior force components of centric occlusion together with teeth rotations are also, therefore, responsible for the embedding of lower lingual bars into lingual tissues of the mandible.

4. Tipped and periodontally weakened teeth gain mechanical advantage through fixation. Cantilever construction should not be used on loosened teeth.

5. Distal extension partial dentures should never "reach in" between isolated abutments. To do so places the



24A. *Since the sagittal axis of mandibular rotation occurs at* 0, *the lower second molar, first molar, and lower incisors describe the respective arcs* X, Y, *and* Z *whose tangents are* X^1, Y^1, *and* Z^1. *It can be seen that each successive tangent has a smaller component of anterior thrust as designated by* x, y, *and* z. *This is true because radius* 1 *approaches the vertical more closely than radius* 2 *or* 3.



24B. *Shows absence of horizontal anterior thrust if the sagittal axis of mandibular rotation,* 0, *were to fall on the occlusal plane,* AB. *All the tangents would be perpendicular to the occlusal plane.*

isolated abutment under great mechanical disadvantage. It should be attached to the nearest tooth anteriorly in a fixed bridge and the *bridge* should be used as the partial denture abutment.

6. If teeth have been tipped or inclined appreciably from the vertical axis during orthodontic treatment, collapse is likely to be prompt through the introduction of large horizontal vectors of force in the root structures.

7. If the "impression" and the "bite" are not at fault, the anterior forward "tick," when full upper and lower dentures are brought into firm centric occlusion, is caused by the anterior thrust component of centric occlusion.

Conclusion

The physical properties of dental materials and structures are discussed. Basic concepts and principles of engineering apply to dental fabrications. Once the physics of a given situation are known, an intelligent course of action suggests itself.

Dentists should take advantage of the leverages which nature affords to counteract the leverages which man must impose through dental prostheses. Fixation of abutments should be employed to take maximum advantage of the foundational capacity of weakened investing tissues. Fixation provides the mechanical advantage of leverage and simultaneously restricts the excessive tooth movements which exacerbate local infectious processes. The reason smaller abutments may be used with split joint cantilever bridgework is that the foundational structures give. When the foundational structures pick up stability, the abutments are racked more, and the cement gives way because it is the weakest link in the system. But this proves the premise. To offset the problem of structural failure, prepare substantial abutments.[6]

7815 *Jefferson Avenue, East*

[6]Smyd. E. S.: Mechanics of Dental Structures: Guide to Teaching Dental Engineering at Undergraduate Level, J. Pros. D. **2**:668-692 (Sept.) 1952.

CEMENTOMA—

Differential Diagnosis and Discussion

JOSEPH E. PRIMACK, D.M.D., Haverhill, Massachusetts

DIGEST

During routine roentgenographic examination a condition is sometimes encountered which is often misdiagnosed. This condition, variously called cementoma, cementoblastoma, and periapical fibrosis, is said to have an incidence of approximately 2.4 per thousand, and is found most frequently in women about 41 years of age. The incidence of mandibular to maxillary occurrence is about 17.1, and the teeth most frequently involved are the lower incisors. When the condition does occur, usually more than one tooth is involved.[1] This article describes the measures employed in clinical and specific diagnosis and discusses a number of conditions with similar symptoms which sometimes add to the problem of accurate diagnosis.

Definition

Cementoma may be defined as a neoplasm of limited growth, originating from the cementoblastic elements of the periodontal membrane surrounding the apex of a tooth.

Etiologic Factors

The etiology in this condition is often attributed to traumatic occlusion and traumatic habits such as fingernail biting, pipe smoking. Although there may be such relationships, it is doubtful.

Traumatic Occlusion Possible Etiologic Factor—The fact that the lower incisors are most frequently involved might also indicate the possibility of traumatic occlusion as an etiologic factor, but cases are reported where there is no occlusion in the affected area and no history of trauma. The overall incidence of traumatic occlusion is far out of proportion to the incidence of cementoma.

Possible Constitutional Etiology—The fact that cementomas are often multiple points to a possible constitutional etiology.[2]

Phases in Development Observed Radiographically

There are three distinct phases in the development of cementoma which may be distinguished radiographically:

1. In the first phase the area is composed of cellular tissue with no calcification. Radiographically, osteolysis is seen resulting in a subapical or periapical radiolucent area surrounded by a thin area of bone condensation which is often mistaken for other lesions.

2. In the second phase the tumor has started to form cementum. The area now shows a central radiopaque mass within a radiolucent periphery. The diffuse bone condensation surrounding the area generally persists with little change throughout all of the stages.

3. The mature, inactive stage is reached when the calcified structure is surrounded by a thin dark area which represents a connective tissue capsule. Investigators who have watched these lesions over a period of years have noticed little change in the size of mature cementomas.[3]

Lack of Clinical Change Important in Diagnosis—Clincially, the tumor produces no change in the tooth whose apex is involved. The tooth remains normal and asymptomatic in every respect with no change in color, translucency, or vitality. These symptoms or lack of symptoms are of great importance in the differential diagnosis of cementoma.

Microscopic Examination Required for Final Diagnosis

A differential diagnosis of any condition of this type can be made only from a microscopic examination of a specimen taken from the area in question. Final diagnosis cannot be reached from radiographic and clinical evidence alone. It is not good practice, however, to condemn a healthy, vital tooth merely to confirm a clinical diagnosis of an innocuous benign condition.

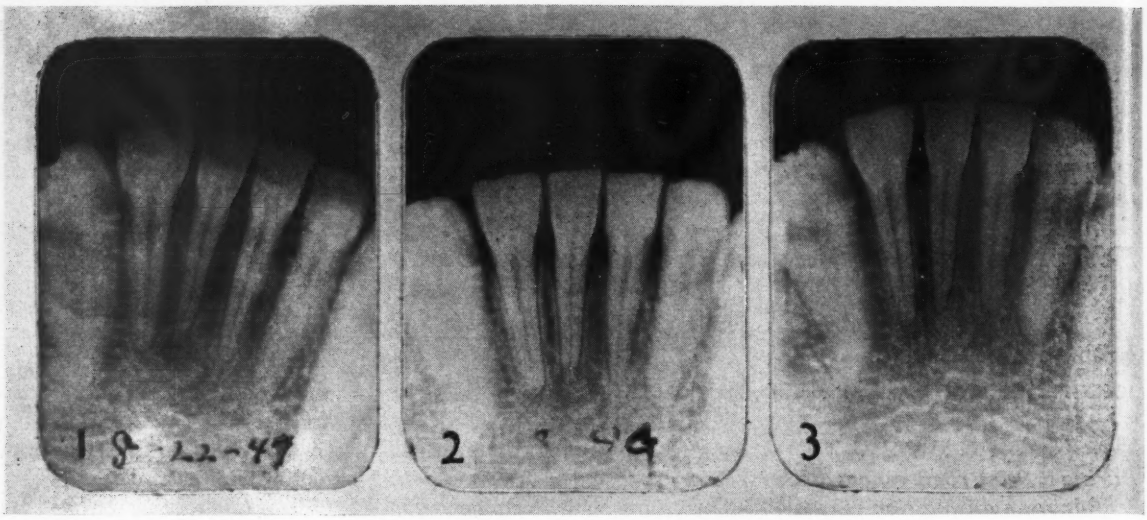
Clinical Diagnosis Generally Acceptable—The clinical picture, combined with a typical radiographic appearance, especially in more advanced stages, helps to establish in most cases of cementoma a clinical diagnosis which is generally acceptable.

Subjective Symptom—The only subjective symptoms that might develop which should cause consideration of surgical removal is the rare occurrence of possible deformity should the tumor grow extensively.

[1]Stafne, Edward C.: Periapical Osteofibrosis, JADA **21**: 1822-1829 (Oct.) 1934.

[2]Thomas, Kurt H.: Pathology, St. Louis, C. V. Mosby Company, 1941.

[3]Scannell, John M. Jr.: Differential Diagnosis of Cementomas. Oral Surg., Oral Med., Oral Path. **2**:1169-1180 (Sept.) 1949.



1. ***Cementoma in early second stage in 1947. Note the radiolucent mass directly below the root of the left central, within a radiolucent area which appears to be continuous with the periodontal membrance of the tooth and which is surrounded by a diffuse area of bone condensation.***

2. ***Cementoma, later second stage in 1949. The radiolucent area is not appreciably enlarged, but the radiopaque area shows enlargement in proportion to the entire mass. Note the small area of diffuse radiolucency below the apex of the left lateral which was missed at the time.***

3. ***The cementoma on the central has reached the mature stage in 1954. Note the thin radiolucent line, which is all that is left of the large radiolucent area in the earlier stages. The area of radiolucency on the left lateral might be mistaken for granuloma. Three small centers of calcification may be detected in this area.***

Radiographic Resemblances

Conditions which may resemble cementoma radiographically in its various stages are the following:

Granuloma—Radiographically, the first stage is indistinguishable from granuloma. Granuloma is generally associated with inflammation of the pulp and tests for vitality help establish the differentiation.

Radicular Cyst—The area might be mistaken for a small radicular cyst. Again vitality tests are of value and careful examination of the radiograph will usually show the typical sharp demarcation line which represents the cortical bone layer of a cyst.

Loss of Bone Around Apexes—Hyperparathyroidism sometimes causes loss of bone around the apexes of teeth. Pulp tests in these cases would be positive. A clinical test that would establish differentiation would be chemical analysis of the blood for calcium and phosphorus levels as no significant changes in blood levels have been observed in cementoma.[3]

Paget's Disease—This condition produces radiolucent, cyst-like spaces that may be mistaken for the early phase of cementoma if superimposed over a tooth apex. These lesions bear no relationship to tooth position and may be scattered throughout the jaw, and indeed throughout the entire skeleton.[4]

Monostotic Fibrous Dysplasia[4]—When associated with a tooth apex or periapical fibroma,[5] this condition may resemble the early stages of cementoma radiographically. Early traumatic or hemorrhagic cysts might also have a similar radiographic appearance. In these conditions the affected teeth are normal clinically and positive diagnosis can be obtained only by histologic examination.

Possible Development from Fibrous Dysplasia—It is possible that similarity to the early stages of cementoma is more than transient, that cementoma is actually a development from an area of fibrous dysplasia which happens to contain the elements for the cementoblastic proliferation typical of the second phase. These elements are most frequently found in the periodontal membrane and most cementomas are found to originate in a definite relationship to the rest of the tooth.

Problems in Diagnosis

The first phase described cannot properly be called a cementoma clinically because here the cementoblastic elements have not yet begun to proliferate and produce cementum. An undifferentiated lesion at the apex of a tooth may follow one of three courses: (1) It may remain fibromatous for an indefinite period, (2) it may be completely replaced by normal bone and disappear, or (3) it may begin to deposit cementum and become a true cementoma.[5]

Diagnosis Simpler in Second Stage—When calcification begins and the second stage is reached, clinical diagnosis is somewhat simpler because the radiographic picture is typical: The central radiopaque area is surrounded by a dark area of considerable thickness. The bone surrounding the cementoma is dense and may resemble the cortical layer surrounding a cyst.

Gradual Transition to Third Stage

[4]Glickman, Irving: Fibrous Dysplasia in Alveolar Bone, Oral Surg., Oral Med., Oral Path. **1**:896-916 (Oct.) 1948.

[5]Stafne, Edward C.: Periapical Fibroma, JADA **20**:668-692 (May) 1943.

—The transition to the third stage is a gradual one with a slow increase in size of the calcified radiopaque area and a corresponding decrease in width of the fibrous capsule until the so-called mature stage is reached. Here the typical radiographic picture is one of a sharply demarcated, thin, radiolucent border surrounding the central homogeneous radiopaque mass. The diffuse bone condensation surrounding the lesion is usually unchanged.

Condition Resembling Second or Third Phase

There are several conditions which may resemble the second or third phases radiographically:

Hypercementosis—This is typically represented by a bulbous enlargement of the apical end of the root, caused by a pathologic overgrowth of cementum upon the root apex. Cementoma is usually situated below the tooth apex. Hypercementosis is usually associated with infection. Vitality tests will usually help confirm the diagnosis in these cases.

Retained Root Tips and Residual Cementomas—Often a root canal can be detected in a retained root. Positive diagnosis in these cases can be obtained only by surgical removal and histologic examination. Residual cementomas may also be mistaken for bone sequestra. The clinical history is helpful in differentiation.

Odontomas in Early Stages—Cementoma is actually a type of odontoma, but typical odontomas are composed of the various dental tissues in combination and close examination of the radiograph may show the difference. Odontomas will cause displacement of the adjacent teeth and will appear radiographically as a cluster of tiny tooth buds. Differentiation is in the position of the lesion, the cementoma usually being found in relation to the apex of a normal tooth. Other factors are tooth displacement and the radiographic appearance of the lesion itself.

Eburnated or Sclerotic Bone—Also referred to as enostosis, eburnated or sclerotic bone may appear as a circumscribed opaque area, denser than the surrounding bone. Surgical removal of these areas is generally quite difficult, whereas cementomas will usually shell out easily.

Calcified Objects—Superimposition over an apex of other calcified objects, such as submaxillary calculus or supernumerary teeth, may also resemble cementoma. Radiographs from different angles will help establish the differentiation.

Condensing Osteitis—In this condition in which there is bone condensation about the apex of an infected tooth there may be a resemblance to cementoma. Vitality tests are helpful in making a differential diagnosis.

Area Should be Observed—Cementoma as an asymptomatic condition which does not in any way affect tooth vitality or cause damage to the oral cavity is an innocuous condition which should not be removed surgically but rather should be kept under observation. Cementoma, as a benign condition, should be submitted to surgery only if it should grow to such a size as to cause deformity.

Important Diagnostic Measures

The value of vitality tests in addition to other clinical diagnostic tests in the diagnosis of oral conditions is great. Many normal vital teeth are extracted as infected teeth because the radiograph shows an area at the apex which is not quite "normal." Every radiograph showing a suspicious area should be carefully examined under a magnifying glass and all of the clinical symptoms and history should be carefully correlated with the radiographic evidence before a final diagnosis which would condemn a tooth is made.

Case Report

A white woman of Italian descent was first seen in 1947 when a routine roentgenographic examination revealed the condition shown in Figure 1. The tooth involved was completely normal in appearance. Responses to vitality tests (heat and electric) were also normal.

No Evidence of Traumatic Occlusion—The patient was 32 years old and had no clinical evidence of traumatic occlusion. The only habit that might be considered an etiologic traumatic factor was thread biting.

Radiographic Symptoms—Examination of the radiograph (Fig. 1) showed a radiopaque mass immediately below the apex of the left lateral incisor, within a radiolucent area, limited by an area of diffuse bone condensation.

Diagnosis—On the basis of the clinical and radiographic symptoms, a diagnosis was made of cementoma, early second stage, and it was decided to keep the area under observation.

Symptoms of Second Stage—In 1949 the clinical appearance was unchanged. The patient had stopped the thread-biting habit. Both the radiopaque area and the radiolucent periphery, especially the central radiopaque area, shows signs of moderate enlargement in the radiograph taken at that time (Fig. 2). This is typical of the progress in the second stage.

Mature Phase Reached—The latest radiograph, taken in 1954 (Fig. 3), reveals that the lesion on the left central has reached the mature phase. The radiolucent area which does not appear to have enlarged appreciably since 1949 has been nearly obliterated by the radiopaque area. Note the left lateral incisor which shows a definite subapical radiolucency. Note the similarity to granuloma in appearance. This tooth, like the central, is also completely asymptomatic.

Early Evidence Present—In the radiograph taken in 1949 (Fig. 2) evidence of osteolysis may be observed below the apex of the lateral. This was slight and was not observed below the apex of the lateral. This was slight and was not observed at the time of the examination. By 1954 enough change had occurred to be easily visible and reference to the older film confirmed what was now known to have been developing at that time.

Calcification Detected in Recent Roentgenogram—The area on the lateral cannot be diagnosed clinically as cementoma until there is radiographic evidence of central calcification. In

the most recent picture three tiny centers of calcification can be detected within the radiolucent area.

Tendency to Multiplicity—A lesion of this type is properly referred to as a periapical fibroma although the probability is that it is actually cementoma in the early state since there is a tendency for cementoma to be multiple and this patient already has a more fully developed cementoma.

Observation Continued—This area will be kept under radiographic survey to determine its eventual outcome. No surgical interference is contemplated.

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Announcement of Books Received

THE DENTAL ASSISTANT, By John C. Brauer, D.D.S., A.B., M.Sc., New York, McGraw-Hill Book Company, Inc., 1955. Price $7.00.

ZAHNERSATZ DURCH KRONEN, BRUCKEN UND PARTIELLE PROTHESEN, By Karl Christian, Vienna, Wilhelm Maudrich, New York, Intercontinental Medical Book Corporation, 1954. Price $20.00.

ACCEPTED DENTAL REMEDIES, By American Dental Association, Council on Dental Therapeutics, Twentieth Edition, 1955. Price $2.00.

BODY CHEMISTRY IN HEALTH AND DISEASE By Melvin E. Page, D.D.S., and D. L. Brooks, A.B., Reprinted from DENTAL DIGEST by the Page Foundation, St. Petersburg, Florida, 1954. Price $3.00.

VIRAL AND RICKETTSIAL DISEASES OF THE SKIN, EYE AND MUCOUS MEMBRANES OF MAN, By Harvey Blank, M.D., and Geoffrey Rake, M.B., B.S., Boston, Little, Brown & Company, 1955. Price $8.50.

PARTIAL DENTURES, By John Osborne, Ph.D., M.D.S., F.D.S., and George Alexander Lammie, Ph.D., B.Sc., H.D.D., Oxford, England, Blackwell Scientific Publications, 1954. Price $9.50.

MAXILLO-FACIAL LABORATORY TECHNIQUE AND FACIAL PROSTHESES, By Stanley Brasier, London, Henry Kimpton, 1954. Price $5.50.

THE PSYCHOLOGY OF THE MOUTH, By G. Neil Jenkins, M.Sc., Ph.D., Oxford, England, Blackwell Scientific Publications, 1954. Price $7.00.

MEDICAL DEPARTMENT, UNITED STATES ARMY. A HISTORY OF THE UNITED STATES ARMY DENTAL SERVICE IN WORLD WAR II, By George F. Jeffcott, D.M.D., Colonel, (DC) USA, Washington, D.C., Superintendent of Documents, U.S. Government Printing Office, 1955. Price $3.25.

PRINCIPLES AND PRACTICE OF THE DENTAL ASSISTANT, By Samuel Fine, D.M.D., Worcester, Massachusetts, The Hamilton Publishing Co., 1955. Price $3.00.

ORTHODONTICS FOR DENTAL STUDENTS, By T. C. White, L.R.P.C. (Edin.), L.R.F.P.C., D.D.O. (Glas.), F.D.S., R.C.S. (Edin.); J. H. Gardiner, B.D.S., L.D.S. (Manc.); and B. C. Leighton, H.D.D. (Glas.), D.D.O., L.D.S., R.C.S. (Eng.), London,Staples Press Limited, 1955. Price $8.00.

SURGERY FOR DENTAL STUDENTS, By Michael F. A. Woodruff, M.D., M.S. (Melb.), F.R.C.S. (Eng.), Oxford, Blackwell Scientific Publications, 1954. Price $6.50.

AN ATLAS OF DENTAL HISTOLOGY, By E. B. Manley, M.Sc., B.D.S., F.D.S., R.C.S. (Eng.); E. B. Brain, B.Sc., F.I.B.P., F.R.P.S.; and E. A. Marsland, Ph.D., B.D.S., L.D.S., R.C.S. (Eng.), Oxford, Blackwell Scientific Publications, Ed. 2, 1955. Price $4.50.

The EDITOR'S *Page*

DENTAL and medical practitioners have consistently resisted and opposed mass medication or any therapy that appeared to be "shotgun" prescribing. Ideal therapy has always been based on the individual needs and requirements of a particular person at a particular time following an evaluation based on personal history taking and the clinical examination. It appears that this ideal has been forgotten or ignored in the program of fluoridation.

In fluoridation the chemical is placed in the communal water supply at the water treatment installation in the proportion of one part of fluoride to a million parts of water. No attention has been given to the natural hardness or softness of water although the amount of inorganic salts, notably calcium and magnesium, has an important effect on the toxic manifestations of fluoride either in the form of tooth mottling or other more disastrous cumulative effects. In general, the "harder" the water, the less danger from fluoride toxicity. Communities vary greatly one from the other in the amounts of inorganic salts in the water supply and this should be considered in planning any water-treatment program.

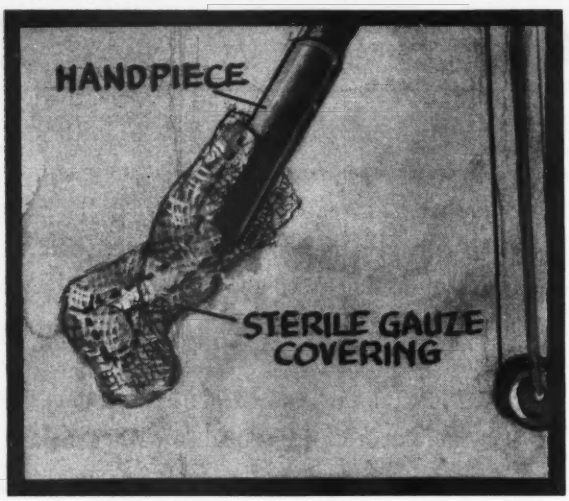
Nor is there any assurance that the 1 ppm that is put in the water at the treatment plant is delivered in uniform amounts at the faucets of the users. A spot check might reveal that some consumers were getting more and others less than the dose of 1 ppm that is considered to be protective to developing teeth and harmless to adults.

Nor has there been any consideration given to the *amount* of water that is used by different people. Water that is drunk is not the only form in which water is used. Water that is used in cooking, in tea, in coffee, soft drinks, and beer must be considered. Adults, who are not helped by fluoridation, ingest more fluids in these forms than the children for whom the fluoride program is intended.

It has been estimated that one quart of water used daily supplies 1 milligram of fluoride. In addition to that supplied in water, the fluoride in foods and drinks such as in sea foods, peas, tea, may supply an additional 1 to 3 milligrams a day. In the case that the person uses more than one quart of water a day because of climatic conditions or work in surroundings of extreme heat it is possible that he is getting another 2 to 3 milligrams of fluoride a day. It is quite possible, therefore, that one person will ingest no more than 1 milligram a day while another person is taking 5 to 6 milligrams. The possible cumulative toxic danger in the latter case is apparent and has been given little or no consideration by dentists or physicians.

The most enthusiastic advocates of fluoridation are in agreement that this measure is most effective in the first eight years of life. Certain questions come to mind with respect to the infant and child that require answers. What is the difference in the fluoride intake between the breast-fed baby and the one that is given an infant formula? Does the mother who has been drinking fluoridated water secrete milk of the same fluoride concentration as is present in the water she drinks? Infants and children vary widely in their consumption of fruit juices, soups, milk, and water although the bulk of the fluid intake until the age of six is from *milk*. The child who has a high intake of milk and a low intake of water is probably not receiving enough fluoride to protect his developing teeth. The calcium in the high milk intake, however, will protect him from any toxic effects. The child who receives milk-powder dissolved in water will receive more fluoride and if in addition he ingests large amounts of water he receives dental caries protection from fluoride and the added danger of toxic manifestations either in the form of mottling or other complications.

The placing of 1 ppm fluoride in the community water certainly disregards the requirements, idiosyncrasies, reactivities, variabilities of thirsts and appetites of *individual persons* and in that way is contrary to the therapeutic ideal of *personalized* service.



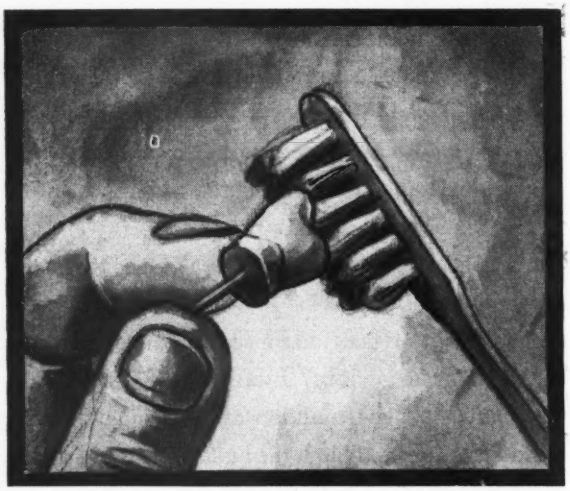
1

Clinical and Laborator

Sterilizing of Handpiece

Harold F. Kedian, D.M.D., Watertown, Massachusetts

1. In the presence of the patient sterilize the handpiece and cover it with sterile gauze. This gives the patient assurance of cleanliness.

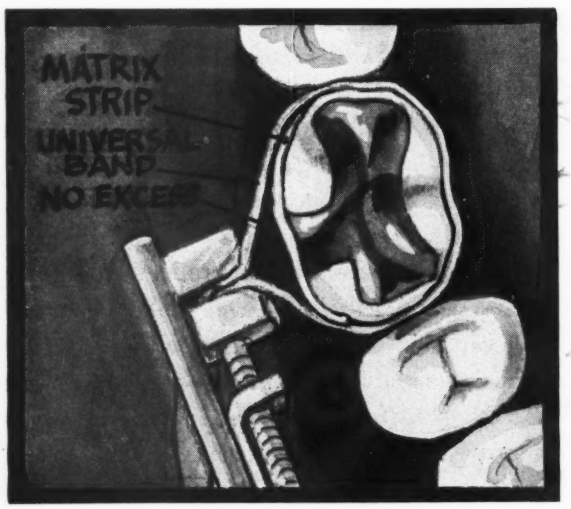


2

Smoothing Wax Carvings

William L. Peecook, D.D.S., Hartsdale, New York

2. After carving the wax pattern for a crown or inlay, rub the wax with a dry soft toothbrush. This procedure gives a good finish to the wax and aids in the adaptation of the margins.



3

Modified Matrix for Buccal Extension Cavities

J. Robert Maydew, D.D.S., Denver

3. Insert a small wedge of metal matrix strip at the buccal extension of the cavity before tightening the universal matrix band. This permits better adaptation of the amalgam at the buccal extension.

READERS *are Urged to Collect $10.00*

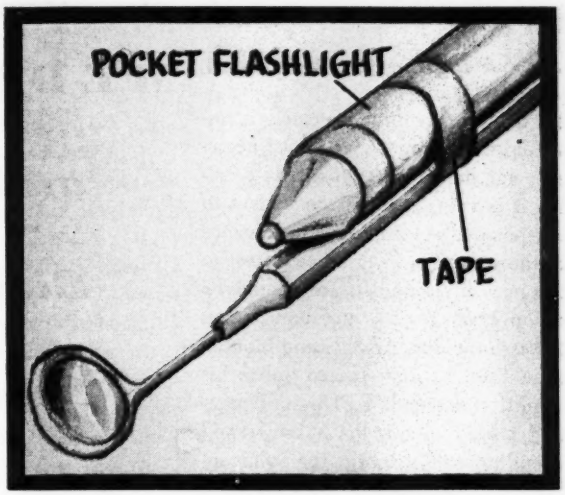
For every practical clinical or laboratory suggestion that is usable, DENTAL DIGEST will pay $10.00 on publication. You do not have to write an article. Furnish us with rough drawings or sketches, from which we will make suitable illustrations; write a brief description of the tech-

SUGGESTIONS . . .

Better Visibility for Surgery

Erwin C. Lubit, D.D.S., Brooklyn

4. Attach a pocket flashlight to a mouth mirror to give additional light during such surgical procedures as root removals.

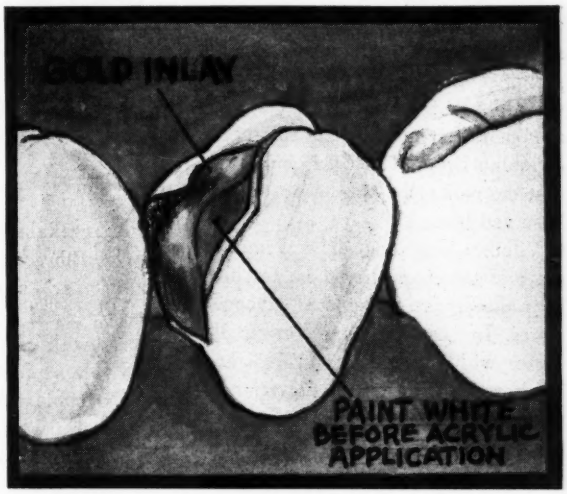


4

Masking the Gold Under Acrylic Facings

Eugene A. Leatherman, D.D.S., Lake Charles, Louisiana

5. On the area of the gold crown or in the window of an inlay that is to be covered with acrylic, paint a coating of ordinary white ink. Allow to dry and repeat if necessary. The white ink prevents the gold from reflecting through the acrylic and thereby makes the restoration opaque.

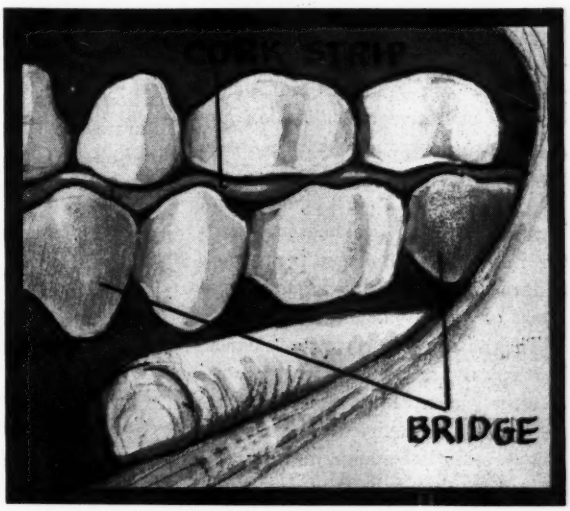


5

The Use of a Sheet Cork Instead of a Bite Block

Ben E. Pleshette, D.D.S., New York

6. Cut strips of 1/16-inch sheet cork into convenient sizes to use when cementing crowns, inlays, and bridges. The cork conforms more easily and evenly to the occlusion and is more comfortable than the wooden block.



6

nique involved; and jot down the advantages of the technique. This shouldn't take ten minutes of your time. Turn to page 562 for a convenient form to use.

Send your ideas to Clinical and Laboratory Suggestions Editor, DENTAL DIGEST, 708 Church Street, Evanston, Ill.

MEDICINE and the Biologic Sciences

Surgery for the Aged

Meticulous preoperative care is essential when surgery is deemed necessary for the elderly patient. If possible it is wise to admit the patient to the hospital several days in advance of the operation in order to adjust to the new environment. He should be encouraged to be up and about through the day. Alcohol and tobacco should not be discouraged unless his condition demands it. This preoperative period allows the surgeon and attending staff to gain the full confidence of the patient through kind, understanding, and optimistic attitudes.

Attractive diets high in protein, carbohydrate, and vitamin content should be served. Frequently the appetite should be coaxed with wine, whiskey, or thiamine. Faulty or absent dentition may be the sole cause of malnutrition. Thus, it is important that the patient be able to eat all that is served him.

Vitamin supplements are important and the liver should be fortified by replacement of depleted glycogen stores. In cases of long chronic illnesses with marked weight loss and interference with normal digestion or absorption interval, parenteral, or tube feedings may be essential adjuncts to the regular oral routes. Testosterone may be of value in restoring positive nitrogen balance.

Thorough evaluation of the cardiac, pulmonary, and renal states must be made. They will, in a large part, determine the relative operative risk. Any concurrent disease intensifies the operative mortality for any given procedure. Diabetes, cardiac failure, and anemia should be brought into full control. The recognition and treatment of such weakness is important in protecting the aged from frank failure precipitated by the additional stress of operation.

The fluid and electrolyte balance, particularly in patients with gastrointestinal complaints should be reviewed and all deficiencies corrected. Dehydration is common and must be treated. It should be recognized that the extracellular fluid space is increased with advanced age.

Particular attention should be given to blood volume. Most elderly patients with chronic disease have a blood volume deficit of between 1000 to 1500 cubic centimeters, despite a normal or near normal hemoglobin, red cell count, and hematocrit.

Elderly patients are more sensitive to all drugs, especially depressants. Dosage should be kept small, not only because the need is less, but because larger dosages are poorly tolerated. Only one-half to two-thirds of the normal adult dose is required, particularly of morphine and the barbiturates, to obtain the optimum desired effect. Chloral hydrate is an excellent nontoxic sedative for this age group.

Every attempt must be made to restore normal function at the earliest date. Food is the best stimulant for return of normal bowel activity in addition to its morale and nutritional benefits.

Coller, Frederick A., and Dobbie, Robert P.: Surgery in the Aged, Geriatrics **9**:303-310 (*July*) 1954.

Sex Hormones During Menopause

Menstruation is regulated by the pituitary-ovarian-uterine axis throughout a woman's reproductive period. The pituitary, ovaries, and uterus function irregularly at the two extremes of reproductive life. Ovulation is not a regular event during the early years of menstrual activity and during the years before the menopause, ovulation again becomes irregular. Irregular pituitary stimulation causes irregular ovulation which may result in metrorrhagia, periods of amenorrhea and menorrhagia.

The luteinizing fraction of the pituitary gland is the last to function in the adolescent girl and the first to fade with the approach of the menopause. The suspension of luteinizing hormone stimulation from the anterior pituitary gland is one of the first physiologic changes associated with the menopause. With its failure ovulation stops.

In the premenopausal woman, follicle-stimulating hormone from the pituitary gland is excessive, progesterone from the ovary is absent, luteinizing hormone from the pituitary is low in amount or absent and there is a gradual reduction of estrogen production from the ovaries. When the menstrual function stops altogether, body estrogen is too low to stimulate endometrial growth and menopausal symptoms may annoy the patient.

Regressive changes in the anatomy of the genital system do not occur immediately upon cessation of cyclic uterine bleeding, as sufficient estrogen is usually provided to keep structures from undergoing significant atrophy. After a few years the endometrium becomes atrophic, as do the uterus, tubes, ovaries, and vagina. The external genitalia decrease in size and subcutaneous fat of the labia majora and other vulval structures is resorbed. The epithelium of urethra, urinary bladder and ureters undergoes atrophic changes, which may be reversed by estrogen substitution therapy.

Estrogen hormone has metabolic effects on most of the tissues of the body. Removal of functioning ovaries from a woman will cause her to complain of loose fitting dentures in a few months. The breast shows atrophy of glandular structures and a reduction in subcutaneous fat. Estrogen hormone influences cell permeability, mineralization of bone, muscle metabolism, nitrogen storage, and water and electrolyte balance.

About 25 per cent of women experience some unpleasant symptoms associated with the menopause. The excess of follicle-stimulating hormone and the reduced amounts of estrogen contribute to vasomotor instability, manifesting itself in "hot flushes." Usually the number and severity of the hot flushes are directly proportional to emotional stress. Estrogen therapy by mouth or intramuscularly is effective in the control of vasomotor symptoms.

Other symptoms usually considered part of the menopausal syndrome are (1) urinary frequency, (2) headaches, (3) insomnia, (4) loss of libido, (5) mild mental depression, and (6) anxiety. With time and direction, the unpleasant symptoms and moods disappear and patients recapture previous energies, interests, and spirits with even greater zest.

Taylor, E. Stewart: Use of Sex Hormones in the Menopause, Geriatrics **9**:223-226 (*May*) 1954.

Vesicular Lesions of Skin Following Coma

In unconscious patients, the possibility of thermal burns is considered when vesicular lesions develop. A suspicion of negligence may arise in cases such as (1) intoxication, (2) asphyxiation, (3) anesthesia, and (4) deep sedation.

In acutely ill patients who are unconscious, an unusual susceptibility to breaking down of the skin in pressure areas is thought to be the result of nerve injuries. In coma there is unrelieved pressure on the skin due to immobility. Furthermore, respiration and circulation are depressed. In some cases residual neuritis is found after the patient regains consciousness.

Blisters resulting from pressure are second degree decubitus lesions, which in the terminology of burns fall between erythema (wheals or welts) and deep necrosis. In the same patient in whom blisters are found, the surface of skin may also show wheals and ulcers, but the vesicles and bullae most strongly suggest burns such as may be attributed to heating pads, hot water bottles, moist heat applications, infrared light therapy or diathermy.

There are several cases in literature to illustrate that the nature of vesicular lesions developing during coma and the responsibility for their occurrence may assume medicolegal interest. Most of these lesions are "second degree" decubitus lesions. They are not pathognomonic of any one kind of coma. They are seen in (1) carbon monoxide poisoning, (2) asphyxia with natural gas, (3) barbiturate intoxication, and (4) spinal anesthesia.

Olsen, C. W.: Vesicular Lesions of Skin in Cases of Coma, J. Nervous and Mental Dis. **118**:412-415 (*Nov.*) 1954.

Tobacco and Anesthesia

The frequency of smoker's bronchitis emphasizes the importance of a deliberate preoperative consideration of the patient's smoking habits. There are many dramatic incidents recorded to prove the damage of such bronchitis. Respiratory obstruction and death in a strong patient may follow the administration of anesthesia.

The conditions attributed to bronchitis from smoking include (1) laryngospasm, (2) bronchospasm and bronchorrhea during the surgical procedure as well as postoperative bronchitis, (3) atelectasis, (4) pneumonia, (5) wound dehiscence, and (6) incisional hernia or recurrence of hernia.

The most common cause of bronchitis is inhaled cigaret smoke when over 10 cigarets are consumed daily. The 1-package smoker usually and the 2-package smoker nearly always acquire the disease. Pipes and cigars can cause bronchitis only when the smoke is inhaled. Cigaret smokers can avoid bronchitis by learning not to inhale. It is generally noted that the incidence of postoperative pulmonary complications is greater among men than bronchitis by learning not to inhale. among women. This discrepancy tends to disappear when differences in smoking habits are considered.

Preoperative evidence of tracheobronchial hyperirritability and hypersecretion can often be induced by requesting the patient to cough vigorously. A normal cough is single, dry and clear and not easily produced. An abnormal cough is a self-propagated paroxysm, either wet or dry. Wetness is a significant factor with respect to anesthesia.

An abnormal cough is rare unless the patient has tracheobronchial disease, the cause of which is usually detectable. Abnormal cough is almost always obtainable before operation from patients who have postoperative respiratory complications. A few heavy cigaret smokers have normal test coughs but give evidence of bronchitis by morning expectoration or excessive amounts of mucus obtained by intubation.

Smoking alone does not cause bronchitis severe enough to be classed as wet bronchiectasis, but may do so when aided by some synergistic factor. Pulmonary emphysema seems to be unusually frequent among inveterate cigaret smokers with bronchitis.

Four weeks without smoking will cure any uncomplicated case of smoker's bronchitis as determined by the test cough. Two weeks will stop slight involvement. Even twenty-four hours without smoking brings significant improvement. However, cessation of smoking shortly before operation is usually difficult for the patient. Therefore, the best advice is to have the patient cough until clear just before starting anesthesia. Such a precaution reduces the likelihod of complications.

Greene, Barnett A., and Berkowitz, S.: Tobacco Bronchitis: An Anesthesiologic Study, Ann. Int. Med. **40**:729-742 (July) 1954.

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Exodontics

Fluoridation

IMPORTANT review of chlorophyll therapy

A recently published appraisal,* covering twenty-five years' experience in the medical field, strongly confirms the value of topical chlorophyll therapy. Dental practitioners will be interested to note that clinical opinion is in agreement on these points:

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*Smith, L. W.: The Present Status of Topical Chlorophyll Therapy, New York J. Med. *55*:2041 (July 15) 1955.

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Medicine and the Biologic Sciences

Miscellaneous

Nutrition and Health

Operative Dentistry

Oral Pathology

Orthodontics

Roentgenography

Contra-Angles

Restaurants and Nutrition

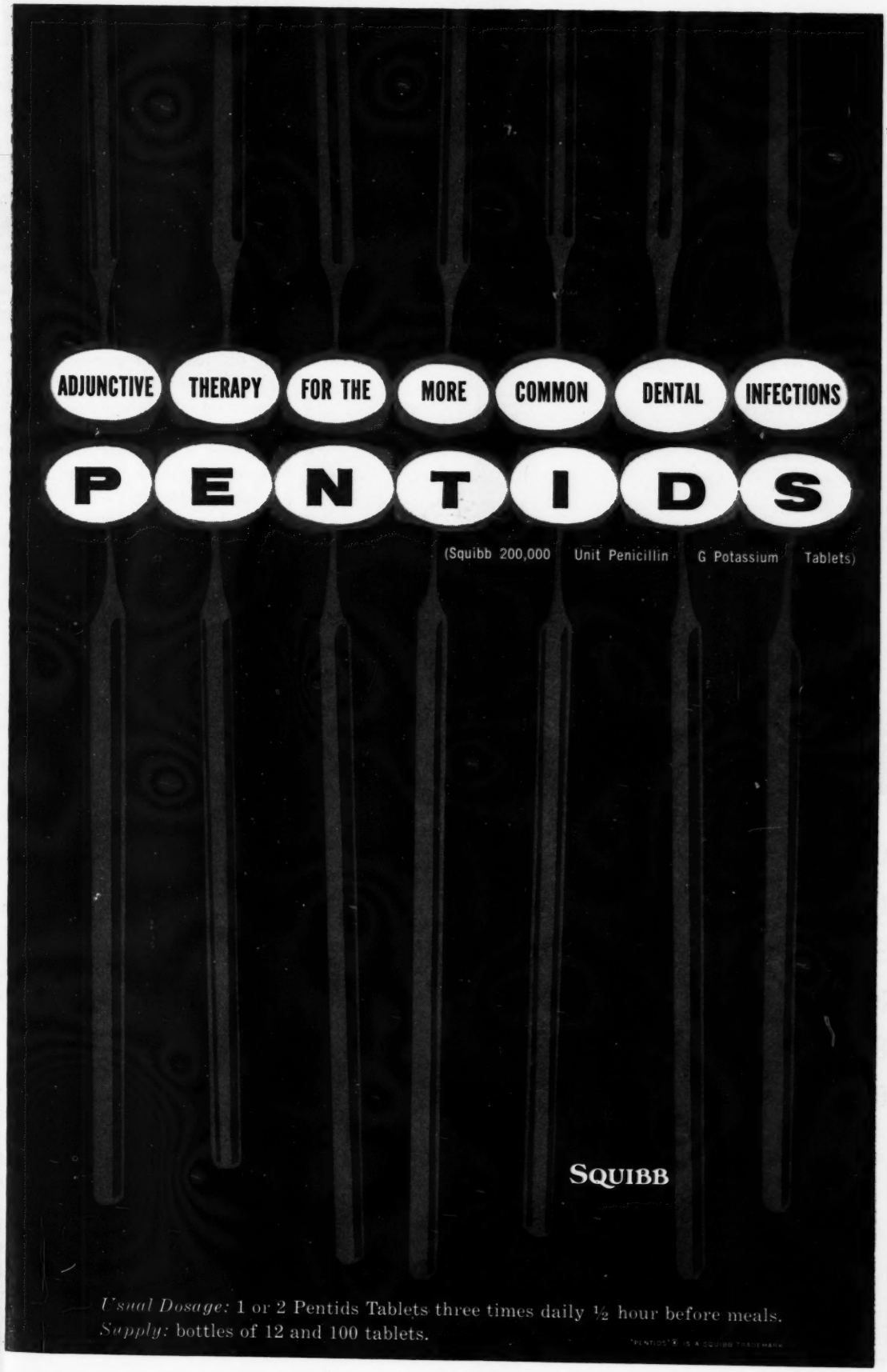
In a restaurant the other day I saw an obese boy of 14 or 15 eat six hard rolls with an equal number of pieces of butter before he ordered his dinner. I wasn't around long enough to watch him eat his dessert, but I would guess that he had pie or cake a la mode— maybe both and two pieces of each.

This boy was in company of his parents who so far as I could see or hear, made no effort to curtail his fat-producing appetite. The boy quite likely has extensive tooth decay and the parents blame the dental profession and one dentist in particular for his disease plight. They do not blame themselves.

Although overnutrition is as bad as undernutrition we hear little about this side of the issue. Biologists know that early maturation in any species leads to early death. Early maturation in turn is often associated with overnutrition. Or, to put the thought in another way: biologists are aware that "the thin rats bury the fat ones."

The ritual in a good restaurant encourages obesity. There are rolls and butter in generous lots before one begins to eat the meal. There are salty appetizers to encourage excess fluid intake. There are a dozen or so tantalizing desserts. Obesity in youth is not particularly dangerous but as middle life begins (age 40, according to the biologists) the dangers from overweight are notably increased.

There is always the probability that when one expresses himself with any kind of vigor on the subject of nutrition he finds himself labeled a food faddist. The person who docilely eats anything the food processors and preparers set before him is considered to be a tractable human being. Whoever protests and will not accept the white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flour—white sugar regimen with all its implications is called a food crank. Restaurants particularly do not like people who will upset their smug schedules and standard cuisine.

It is encouraging, therefore, to have the American Medical Association which certainly has thin patience with food faddists, blast restaurants for their indifference to the diet problems of many of their patrons. W. W. Bauer, M.D., the editor of the AMA's *Today's Health*, challenged restaurateurs to remember the "forgotten man" who is on a diet. He suggested:

"The addition of fresh or sugarless canned fruit and skim milk to the menu for diabetics and those watching their weight. A note might be added to the menu saying that artificial sweeteners and nonsodium 'salt' will be supplied on request.

"Persons with gout must avoid meats; therefore, fish, poultry, eggs, cheeses, and pancakes or waffles 'make them happy.'

"Customers who must watch their salt intake have a harder time than almost any other group and will give more trouble. With the progressive aging of the population, and the increase in heart and kidney diseases, it is a sound business prediction that these customers will grow more numerous.

"The low-salt diet requires extra stocks of low-salt bread and unsalted butter or margarine. It means special cooking without salt or with a salt substitute. It means extra expense, and this must be reflected in menu prices. But it can also mean an expanding clientele of persons willing and able—no, more happy—to pay the differential in price.

"A special luxury department in a restaurant is suggested rather than a special restaurant, because most persons want a restaurant convenient to where they happen to be at the time. A special restaurant known as such, limits its clientele. The normal diner avoids it; even the one who needs its special attentions may be reluctant to let the world know that he has to eat in a restaurant catering to the abnormal.

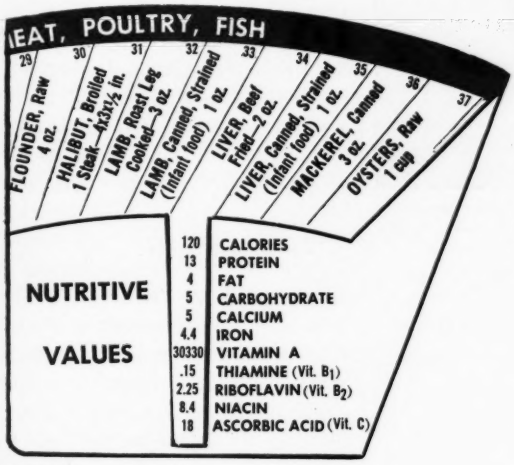
"An individual owner would not need a dietitian to institute such a department, if the industry as a whole got behind the plan and supplied its members with basic information, shopping and planning helps, menus, recipes, and promotion material. Cooks' and bakers' schools, local medical societies, and nutritional consultants could help start such programs."

It would be disastrous for a fine eating place to get the reputation as a "health food" restaurant. In the minds of most people this would suggest carrot juice cocktails, rose hip salads, bonemeal sandwiches. Although these dishes are rich in vitamins A, C, and calcium, respectively, most people consider them too eccentric. Exotic foods, on the other hand, are hunted out by most gourmets. These are usually strange things allegedly eaten by folk in far-off places. Surround them by a fancy name and a stiff tariff on the menu, have a little candle-light and soft background music and people will order the stuff and think they are living it up. The "health food" concoctions are usually served in an at-

Patients will thank you

For showing them how to

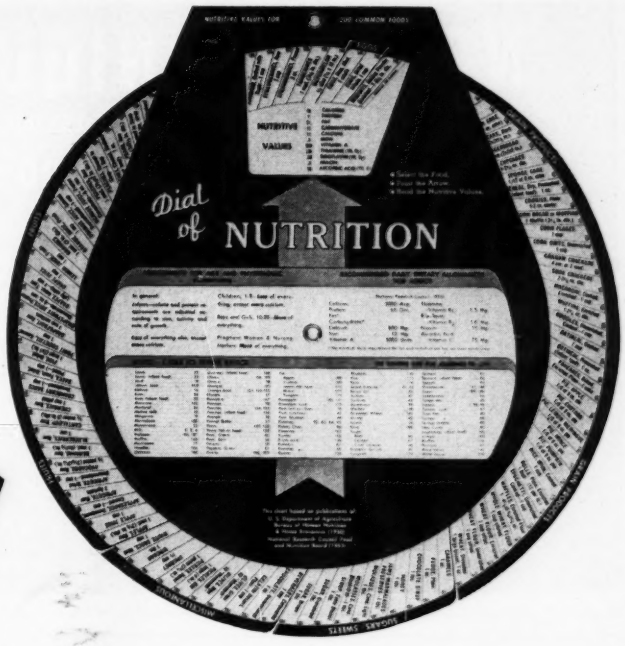
Dial their way to HEALTH



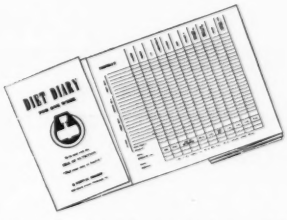
With diet the popular subject of newspaper columns, magazine articles, lectures, and books, the average layman is rapidly becoming nutrition-conscious. Unfortunately, he is also becoming nutrition-*confused*.

You can help the patient who is groping for food-facts (as well as the one whose dental or general health indicates a definite dietary deficiency) by recommending the simple and accurate DIAL-DIARY method of checking food intake in terms of nutritional needs.

The DIAL OF NUTRITION is an 11″ movable disk, printed on both sides and mounted between two indicator panels so that 10 important nutritional components (and the caloric values) of 200 common American foods may be easily read. We have reproduced above, in full size, one of the two indicators you will find on each chart. You have only to select the food, point the arrow, and read the nutritive values which appear in the indicator slot.



The DIET DIARY is a convenient folder in which each item of food eaten at, or between, meals is recorded for the period of one week. The nutritional components of each food are determined by consulting the DIAL, and then entered in the proper spaces on the DIARY page. At the end of the day, or the end of the week, totals are checked against recommended dietary allowances. (All figures on the DIARY and the DIAL are those determined by the U. S. Department of Agriculture and the National Research Council.)



Gaining proper nutritional balance by correcting obvious nutritional deficiencies is then merely a matter of intelligent selection of food—and, again, the DIAL OF NUTRITION is a dependable and convenient guide. Three DIET DIARIES are sent with each DIAL OF NUTRITION.

Order a copy for your own use or enough copies for your practice. We shall be glad to quote discounts on quantities of 10 or more ordered at one time.

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CLINICAL AND LABORATORY SUGGESTIONS

(*See pages* 550 *and*) 551

Form to be Used by Contributors

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Subject: _____

Explanation of Procedure:

Sketch:

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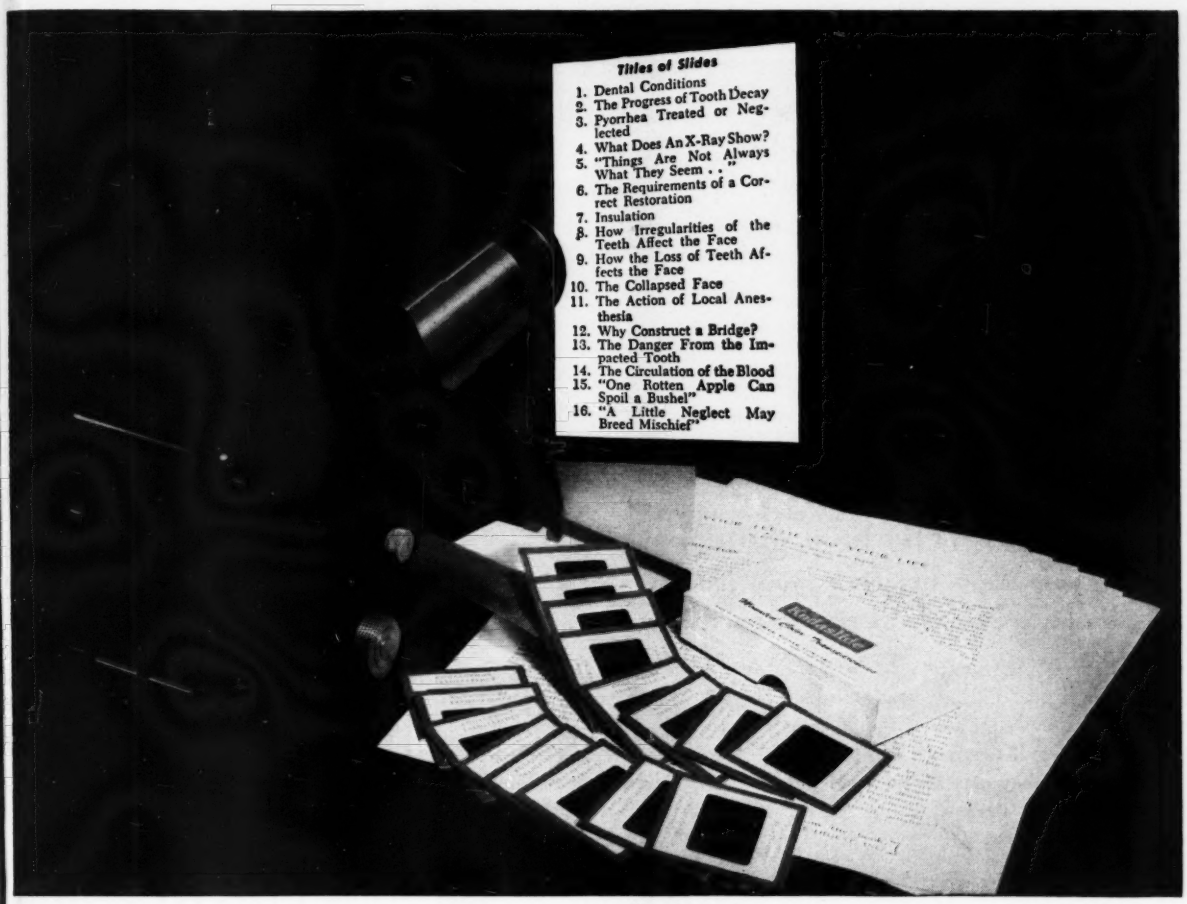
mosphere of glaring lights and ascetic faces that give the event an almost aseptic touch.

If the restaurants are going to take the AMA's challenge seriously, they will have to use sound merchandising in slipping in their health gimmicks.

Although virtually everyone *says* he will do anything to assure his good health, few of us actually make any kind of sustained effort. Almost all of us are deep in our ways of undermining our health by poorly chosen foods, lack of sufficient rest, little or no mild exercise, wound up in tensions. People are so guilt ridden by their knowledge that they are neglecting themselves that the word "health" in some connections takes on an irritating connotation. "Health" food, "health" shoes, "health" resort annoy many people.

So the first thing that the restaurateur must carefully avoid are the words "health," "vitamins," "nutritive." He should make the effort to get over his message of health, but he must do it subtly. If he has salt and sugar substitutes to offer his patrons, he should be able to suggest them and present them in a form and manner that will not be too pharmacopeic. Only recently is it considered to be accepted social form to ask for one of the decaffeinized coffees when eating in a restaurant. The request for dark bread is still considered a sign of eccentricity. I have never heard anyone in a restaurant ask for a salt or sugar substitute. Most people who use these agents supply their own from little bottles that are drawn surreptitiously from a pocket.

Some of our resentment against so-called "health" foods go back to our childhood. The foods were forced upon us because they were "good for you." People have developed lifelong aversions to milk and certain vegtables because they were forced down their gullets in childhood. The association between the disliked thing that was supposed to ge "good" was too strong to be broken, so in adulthood anything that was represented as "good for your health" is likely to be rejected. The successful restaurateur knows this instinctively so he does



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not moralize the issue to suggest to his patrons what is "good" or "bad" for them.

In the "wisdom of the body" the infant or child may wisely reject food because the organism knows that it is not compatible. To have this food forced upon an unwilling body chemistry may set up disease states and psychologic aversions.

We should also give more thought than we do to using sweets to reward our children for good deeds or exemplary behavior. It is not likely that the taste for candy, soft drinks, and ice cream is an innate quality. The child learns early that goodness is associated with sweet goodies. It is not long until he begins to reward himself with generous helpings of the foods that have pleasant associations of social approval. The same kind of psychologic ramifications may be behind the alcohol habit. The alcoholic consistently gets drunk in the hope that he will find something to celebrate. We still have a lot to learn about the psychologic implications of food and drink.

Considerable has already been written on these psychologic aspects of what we eat and drink with a lot of symbolism and hocus-pocus tossed in. There is still much to be learned and we dentists who are so closely concerned with the tissues and mechanism involved in food preparation and drink ingestion should know more than we do on this subject.

—E. J. R.

Approach to Caries Control

BEFORE leaving this short discussion of dental caries, we wish to mention some other work now in progress, which from an experimental point of view concerns an effective approach to caries control by elimination of fermentable carbohydrates from the diet. This procedure requires *complete* and *absolute* abstinence from desserts, soft drinks, chewing gum, candies and other sugar-containing foods. To assure inhibition by inanition of the sugar-fermenting oral microorganisms associated with human tooth decay, the diet must be adhered to rigidly for a minimum of six weeks. Because of the sporadic rather than continuous nature of the caries process, all between-meal snacks must be deleted. This diet should be detergent in consistency, that is, comprised of nonadherent, rough, coarse foods conducive to the frictional cleansing of tooth surfaces. Immediately after each meal a glass of water must be used as a rinse to remove the great bulk of foodstuffs retained in the sheltered areas of the mouth. Brushing the teeth in a manner designed to reach the interdental spaces and necks of the teeth within four minutes following a meal is highly recommended.

Each time this rigid restriction of diet is broken, the dental caries activity test again becomes positive; adherence to the monotonous experimental diet again reverses the reaction.

From *Postgraduate Medicine* **17**:32 (March) 1955.

Practical Prescriptions in Vitamin Therapy

SAMUEL C. MILLER, D.D.S.,
HARRY ROTH, B.S., D.D.S.,
and MARVIN SIMRING, B.A., D.D.S.

Experimental Vitamin Therapy

In a group of 40 patients who gave evidence of pathosis of the periodontal tissues and/or oral mucosa experimental vitamin therapy was instituted before any other treatment in order to determine the role of the vitamins in the total disease syndrome while all other dysfunctional, irritative and systemic etiologic factors still operated.

Preparations Used

1. Therapeutic general vitamin supply (Theragran): Vit. A—25,000 U.S.P. Units; Vit. D—1,000 U.S.P. Units: Thiamin Hydrochloride (B_1) 10 milligrams; Riboflavin (B_2) 5 milligrams; Niacinamide 150 milligrams; Ascorbic Acid (C) 150 milligrams (Vit. A & D derived from fish liver oil and irradiated ergosterol).

2. Partial Vitamin Supplements (Basic Formula): 10 milligrams Thiamin HCl; 5 milligrams Riboflavin—B_{12}; 150 milligrams Niacinamide; 150 milligrams Ascorbic Acid—Vitamin C.

3. Desiccated Liver: 0.5G. Dehydrated unfractioned edible liver equivalent to approximately 2G of fresh liver; Protein approximately—65 per cent.

4. Rutin and Vitamin C: 20 Milligrams Rutin: 100 milligrams Ascorbic Acid.

5. Combination of Therapeutic and Desiccated Whole Liver.

6. Vitamin A Capsules: 50,000 Units.

7. Rutin: 60 milligrams.

Each patient was given one or another or a combination of the above preparations.

Effects of Vitamin Therapy

Objective Symptoms of Amelioration—Orally, the most striking objective sign ameliorated by vitamin therapy was gingival bleeding. The therapeutic vitamin supplement was highly efficacious. Twenty-four patients reported gingival bleeding; 19 of them (79 per cent) improved under vitamin therapy.

Other objective signs of response to the vitamin therapy were gingival color, gingival tone, and lessened gingival enlargement.

Signs of Subjective Improvement—The neurologic and psychologic symptoms such as fatigue, irritability, anorexia, sleep impairment, headache, peripheral neuritis (tingling of extremities) improved in 19 (or 83 per cent) of the 23 patients in whom they were present with vitamin therapy alone.

Complete Dosage Successful—The complete vitamin therapy including crystalline vitamins and desiccated whole liver in high dosage achieved best results for both subjective and

(*Continued on page* 568)

See second cover D.D.12

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In your ORAL HYGIENE this month

Patient Education—Oh Yeah?

"Our Patient Education campaign is backfiring," complains Doctor David Tabak. "Instead of listening to us with the respect accorded us during the dark ages of dental ignorance, patients now come as judges and critics, arrogantly questioning our advice and outlining exactly what they want done."

Whether or not *your* patients "come as judges and critics," you will enjoy the author's analysis of patient types: the challenger, the wise cracker, the easily offended, and many others.

★ ★ ★

Few dentists have taken on as big a job as Doctor Alfred L. Gerrie. As president of the Tournament Association, he will stage manage the Sixty-Seventh Annual Pasadena Tournament of Roses on January 2. One and a half million men, women, and children will watch the parade in person; fifty-eight million will watch it on television; and twenty-five million will hear about it via the radio. For other near-astronomic figures and many interesting facts, read the article by Doctor Harry Cimring.

★ ★ ★

If you're a "do-it-yourselfer," you will be especially interested in the article, "Restoring an Old Mansion" which explains how Doctor Raymond V. Hennessy turned an old farmhouse into a beautiful modern home.

★ ★ ★

"Public participation in the game of 'Let's Take the Professional Man Apart' is not something that will cease, unless intelligent and aggressive steps are taken," says Charles Fitz-Patrick, in writing about radio and television programs which use dentists and the dental office as subjects of humor. He suggests that dentists protest this grotesque over- the-air cartooning by writing to radio stations and sponsors.

★ ★ ★

Doctor S. J. Levy begins his interesting article by explaining that he had been practicing in a small town for almost twenty years before returning to a large city. What he—in the role of dental patient—observed gave him food for a great deal of thought and material for an analytical article, "Skill Comes Before Gadgets."

★ ★ ★

The final installment of the "Wilbur" series describes the unusually convenient and efficient design of Wilbur's home study. In this room Wilbur finds it easy to attend to personal correspondence, keep personal accounts, and do the thousand and one things that dentists seem never to find time to do at the office. Doctor Robert P. Stickley is the author of the eight articles.

★ ★ ★

Don't forget the regular departments and features. Most of them are short enough to read in just a few minutes and interesting enough to make you feel that your few minutes were indeed well invested.

(*Continued from page* 565)

objective clinical manifestations of nutritional deficiencies.

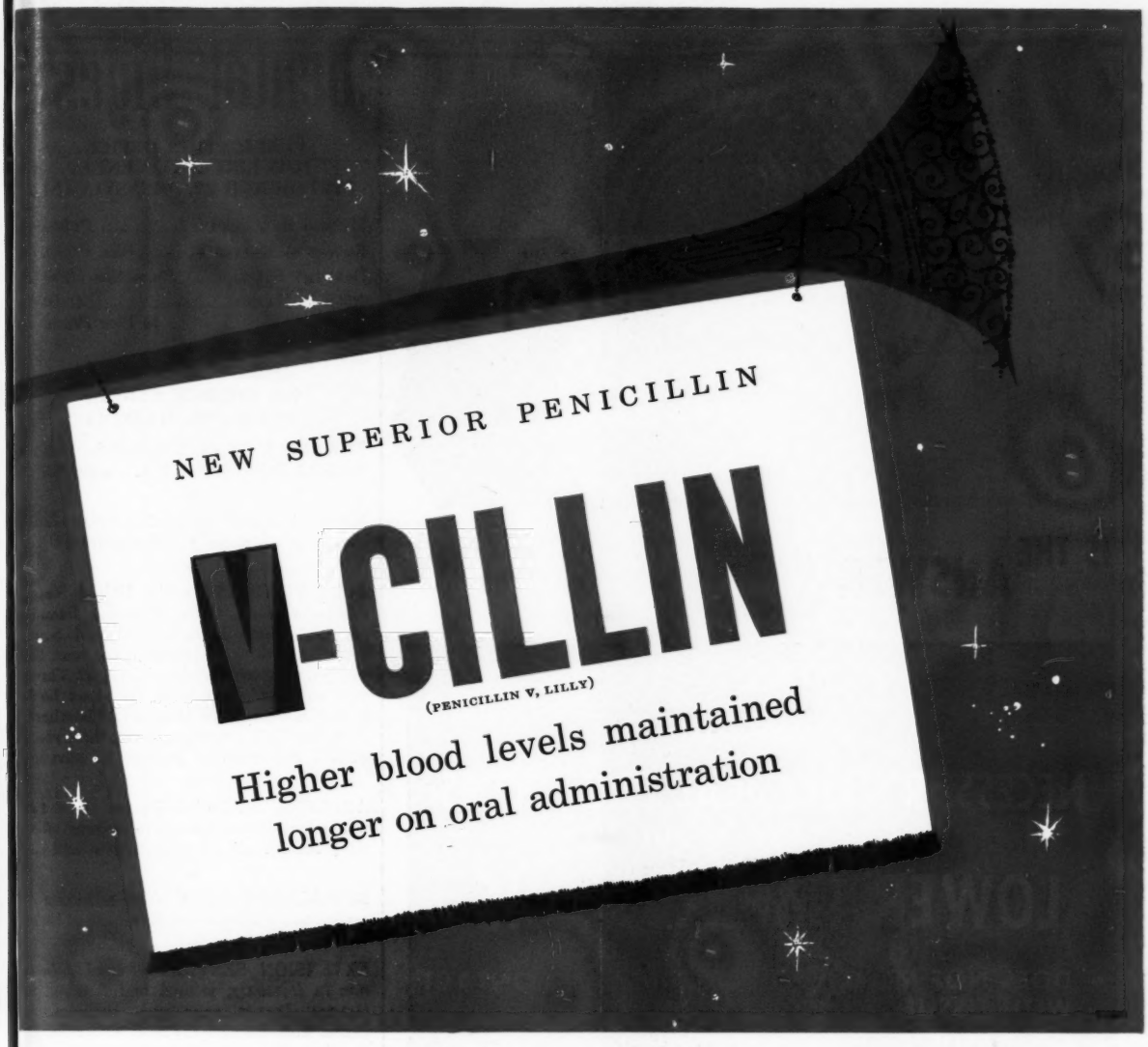
Recurrence upon Withdrawal—The patients routinely "felt better" following vitamin therapy, as evidenced by lessened malaise or fatigue. In those cases for whom vitamin therapy was withdrawn the original symptoms recurred. Resumption of vitamin therapy proved effective in eradicating recursdesence.

Conclusions

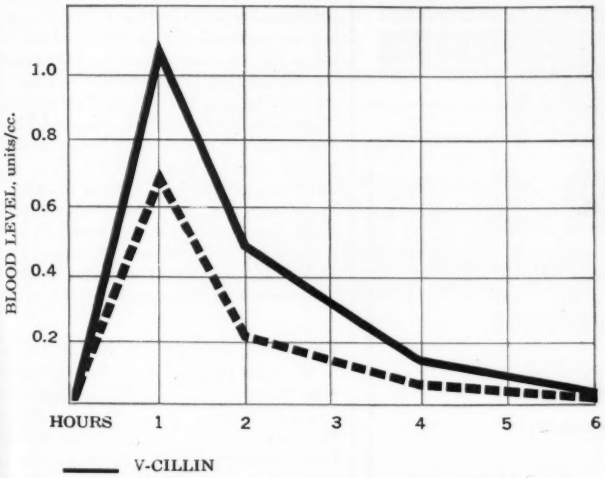
It would seem that both a periodontal problem and a neuropsychiatric disturbance may be symptoms of a general systemic disorder. Since in many cases the disorders may be nutritional in origin or association, they may respond to vitamin therapy as an adjunct to complete treatment. Improvement of the periodontal condition may be expected to the extent that vitamin deficiency is a factor in the cause of the periodontal pathosis.

Adapted from *South Carolina Dental Journal* **12**:5-7 (June) 1954.

Advertising Index



Comparative blood levels following ingestion of 125 mg. penicillin V and 200,000 units of penicillin—G, potassium



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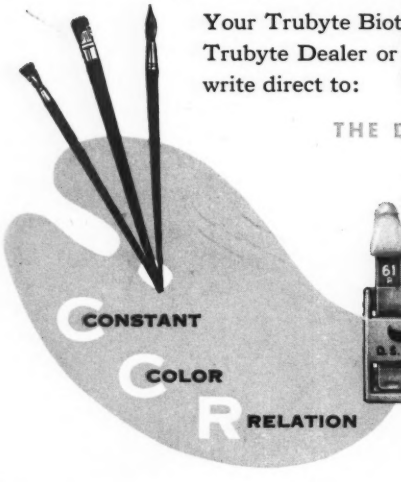

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